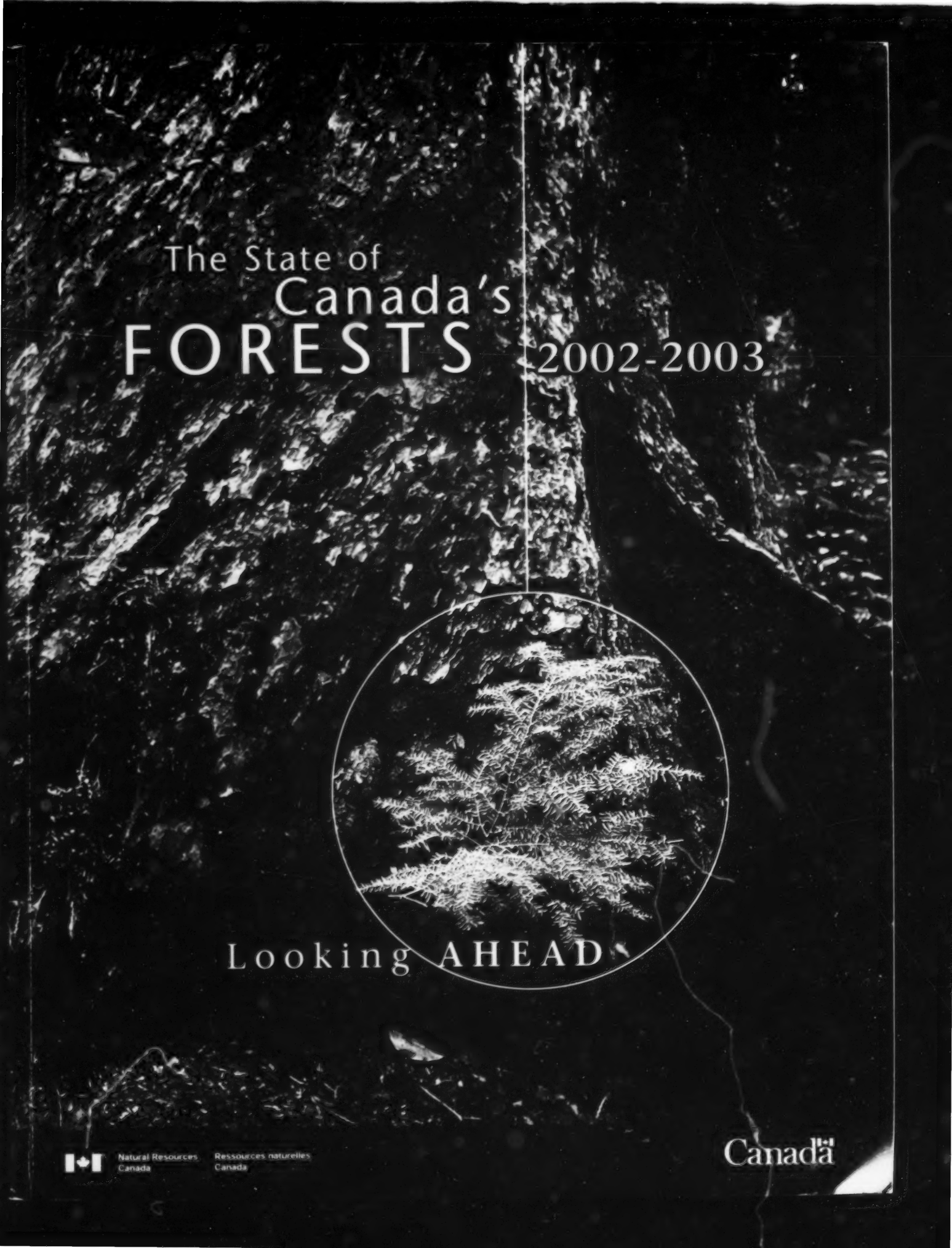
The State of
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FORESTS
2002-2003
Looking AHEAD
Natural Resources Canada
Ressources naturelles Canada
Canada

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MINISTER'S MESSAGE

Canada is a world leader in sustainable forest management. Our National Forest Strategy, Model Forest Program and world-class fire management research are several examples of our expertise and vision embraced by the forest community in Canada and around the world.

Such initiatives and policies start with a dynamic vision of what Canadians want of their forests, integrating the public's environmental, social and economic expectations. This vision guides key forest stakeholders—each with an understanding of the major issues in sustainable forest management—as they participate in developing resolution initiatives through consensus. This approach has resulted in our success to date, and it will continue to shape our national and international forest policy and research agendas well into the future.

The 13th annual report on the state of Canada's forests represents a significant departure from previous reports. While it provides a retrospective of our key accomplishments in sustainable forest management, including the latest national statistical information, this year's feature article gives the reader a sense of what Canada's forest sector may look like in the future.

This vision is based on an exploration of non-timber forest values, the forest industry, science and innovation, international cooperation, forest land management, forestry education and the latest trends in public participation.

In addition, the reader will benefit from the views of what some forest experts and young Canadians say about the future of Canada's forests.

I am proud to be part of making the vision of Canada's forests a reality. Our work in forestry is a key part of the Government of Canada's commitment to the sustainable development of our natural resources—ensuring that they retain their economic importance and continue to contribute to a strong society and communities. Through knowledge, innovation, technology and international leadership, we can ensure our quality of life and build the Canada we want, for ourselves and for future generations.

Herb Dhaliwal

The Honourable Herb Dhaliwal
Minister of Natural Resources

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THE STATE OF CANADA'S FORESTS

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Up FRONT

OVERVIEW
OF CANADA'S FORESTS

All Canadians have a stake in the future of our country's forests. After all, forests cover nearly half of the Canadian landscape and are a dominant feature of our economy, culture, traditions and history. Increasing public interest in forest practices, global demand for wood, interest in non-timber benefits, forest certification, market pressures, biodiversity conservation and climate change are all impacting on the long-term management and use of our forests. This year's report looks at some of these challenges and issues and how they will likely change the forest landscape in the future.

There are 417.6 million hectares of forestland in Canada. Some 37 percent is open forest, comprising muskeg, rock, barrens and marshes, as well as slow-growing or sparse forests; almost 56 percent is considered commercial forest—capable of producing timber and non-timber products. Approximately 119 million hectares, or 28 percent, are currently managed for timber purposes, and 0.4 percent is harvested annually.

Most (94 percent) of Canada's forests are publicly owned; the rest are on private property belonging to more than 425 000 private landowners. Forest management is a matter of provincial and territorial jurisdiction. Each province and territory has its own set of statutes, policies and regulations to govern the management of its forests. A broad spectrum of users—the public, forest industries, Aboriginal groups and environmental organizations—are often consulted to ensure that recreational, cultural, wildlife and economic values are incorporated into forest management planning and decision making. The federal government's role in forestry pertains to such areas as research, trade and commerce, international affairs, the environment, pesticide regulation, training and Aboriginal affairs.

Forests play a key role in moderating the climate, regulating water systems, preventing erosion, alleviating air pollution, and providing wildlife habitat. They also offer a multitude of recreational opportunities, and are enjoyed by Canadians and tourists from around the world.

Finding an appropriate balance among the many uses of our forests has been the key to Canada's success to date. Maintaining this balance will ensure their continued sustainability in the future.

CANADA'S FOREST FACTS

Canada has about 10% OF THE WORLD'S FORESTS, 30% OF THE WORLD'S BOREAL FORESTS, and 20% OF THE PLANET'S FRESHWATER

Canada has 417.6 million hectares of FORESTLAND

183.1 million hectares are NON-COMMERCIAL FOREST and largely WILDERNESS

234.5 million hectares are COMMERCIAL FOREST

2.8 million hectares were burned by FOREST FIRES (2002)

18.6 million hectares were affected by INSECT DEFOLIATION (2001)

1.03 million hectares were HARVESTED (2000)

About TWO-THIRDS of Canada's estimated 140 000 species of plant, animal and microorganism LIVE IN THE FOREST

180 TREE SPECIES are indigenous to Canada

There are 15 TERRESTRIAL ECOZONES within Canada, containing forest types ranging from the coastal rainforests to sparse and slow-growing forests at the Arctic tree line

Canada netted almost $43 billion in FOREST PRODUCTS EXPORTS (2002)

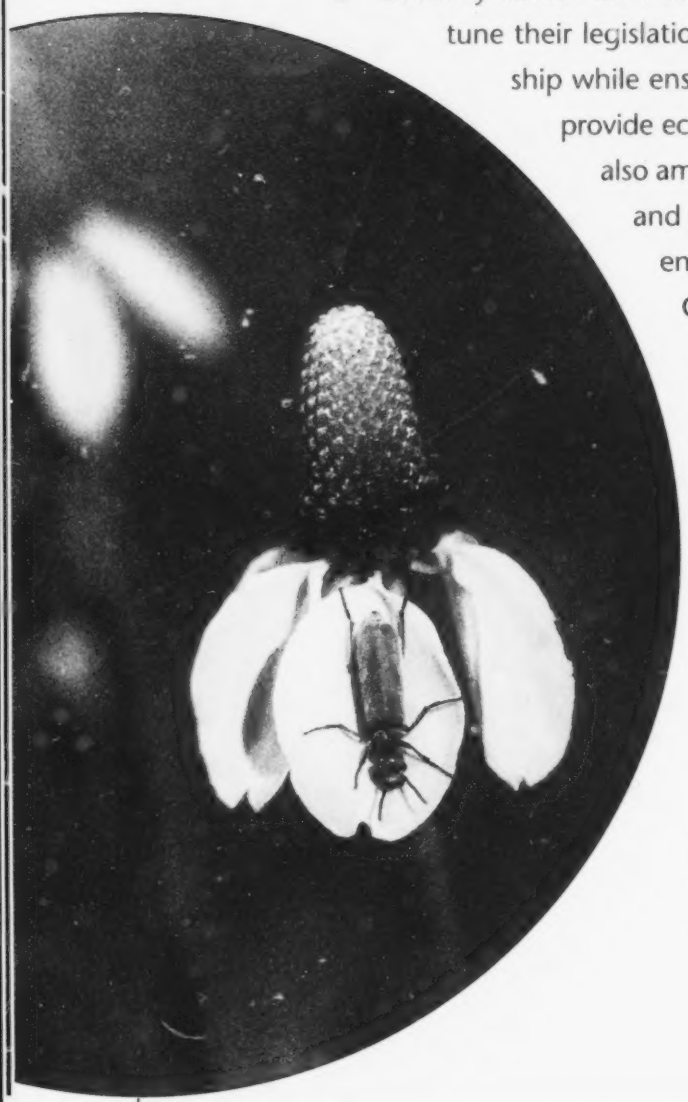
Forest products contributed $32.6 billion to Canada's TRADE SURPLUS (2002)

Canada's forests are the ENGINE behind an industry worth about $74 billion

DIRECT EMPLOYMENT was 361 400 (2002)

The forest-related TOURISM INDUSTRY is worth several billion dollars annually

YEAR IN REVIEW
2002-2003



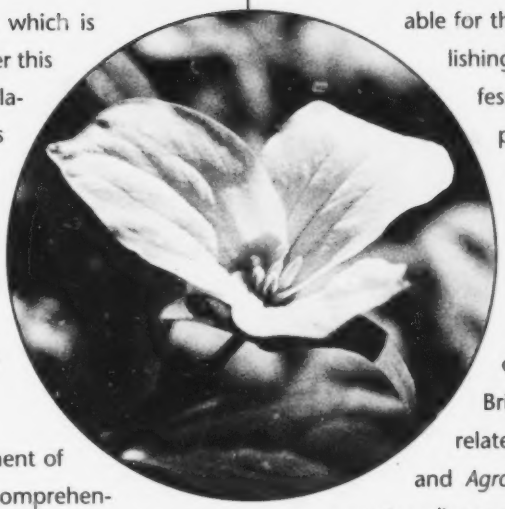
As anticipated, 2002-2003 was another busy year for forest-related activity across Canada. Provinces and territories continued to fine-tune their legislation and regulations to enhance forest stewardship while ensuring that the forest industry can continue to provide economic benefits to all Canadians. Statutes were also amended to reflect Aboriginal culture, knowledge and participation, as well as to identify and protect endangered species and expand protected areas. Great strides were made in applying innovation and technology to forest activities, particularly in areas such as mapping and e-commerce. Despite scientific advancements however, fire, disease and pests continue to create problems for foresters across the country.

SUSTAINING FOREST MANAGEMENT

As anticipated in the Devolution Transfer Agreement, the **Yukon** government assumed responsibility for administration and management of that territory's public forests on April 1, 2003. A Forest Management Branch has been established in the Department of Energy, Mines and Resources to oversee existing forest management responsibilities and begin developing made-in-the-Yukon forest legislation.

Following an extensive consultation process, the ***Nunavut*** *Wildlife Act* was tabled in that territory's Legislative Assembly on March 28, 2003 and received second

reading the same day. Bill 35, which is expected to come into force later this year, is a modern piece of legislation that reflects the traditions and values of the Inuit and is consistent with the Nunavut Land Claims Agreement. The legislation proposes to maintain and advance wildlife protection in Nunavut in a culturally appropriate manner.



In March of 2003 the Government of **British Columbia** initiated a comprehensive forestry revitalization plan that is aimed at increasing the market orientation of forest policies and the competitiveness of the forest industry, while maintaining strict environmental standards. The new plan eliminates a number of restrictive government policies such as minimum cut, requirements to process logged timber within the same company or at specified mills, mill closure penalties, and restrictions on the transfer and subdivision of tenures.

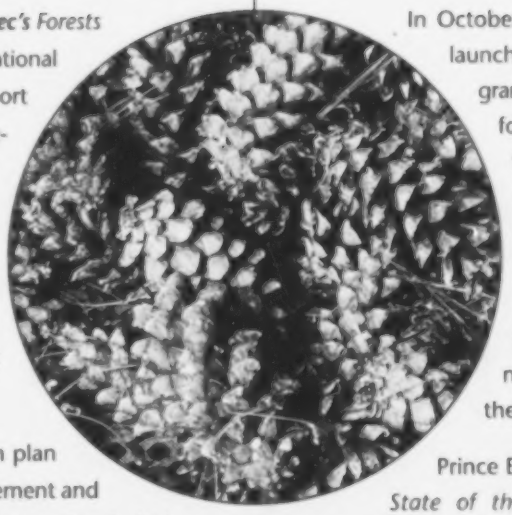
British Columbia also introduced the *Forest and Range Practices Act*, thus beginning the transition to a workable, results-based forest practices code with tough penalties for non-compliance. The new Act reduces red tape, encourages innovation on the part of skilled resource professionals, and holds industry responsible for outcomes, again while ensuring that environmental standards remain at the same high level.

Still in British Columbia, the new *College of Applied Biology Act* is designed to improve forest management by registering biologists and holding them accountable for their work. In addition to establishing a college to oversee the profession of applied biology, the Act protects the public interest, sets strict standards of conduct, establishes a comprehensive disciplinary process, assesses member performance through audits and practice reviews, and establishes education programs. British Columbia also introduced related changes to the *Foresters Act* and *Agrologists Act* in order to enable greater reliance on these resource professionals.

In March 2002 the Government of **Manitoba** released *Next Steps: Priorities for Sustaining Manitoba's Forests*. This document outlines ways for government, industry and First Nations to help Manitoba's forests continue to thrive by adding to scientific and traditional forest knowledge, enhancing forest stewardship, increasing economic opportunities for Aboriginal communities, promoting a sustainable forest economy, and updating and improving existing legislation.

Ontario released its Old Growth Policy and Old Growth Forest Definitions reports in May 2003. These provide direction for the conservation of old growth conditions and values for major tree species or forest community associations in Ontario's Crown forests. They were also intended to comply with the terms and conditions set out in the decision of the Ontario Environmental Assessment Board on the Class Environmental Assessment for Timber Management on Crown Lands in Ontario (1994).

The Report on the State of **Quebec's** *Forests 1995-1999* was tabled in the National Assembly in June 2002. This report presents developments in Quebec's forest system, and details changes in the forest canopy, forest management activities, and the magnitude of natural disturbances, for both private forests and forests in the public domain.



Quebec also unveiled an action plan aimed at strengthening management and control of the development of the province's deciduous forests. Monitoring conducted since 1995 had uncovered deficiencies in the system for classifying stems that have occasionally led to non-compliance with the rules established by the Ministère des Ressources naturelles. In view of this, the Department decided to develop new practices to correct the situation. The anticipated measures deal with all facets of the problem, including management, control, development, training for tree marking, and wood processing.

In December 2002 **New Brunswick** released an independent consultant's report on the province's forestry industry. This assessment favourably benchmarks the quality of the province's stewardship and management of its Crown forest with that of other timber-producing regions of the world. The report outlines how the annual timber harvest on New Brunswick's Crown lands can be doubled in the next 40 to 50 years. The process of gathering public opinion on the report's findings has already begun.

In October 2002 **Prince Edward Island** launched a Forest Enhancement Program designed to provide incentives for woodlot owners to develop forest management plans. The focus is on non-clearcut treatments that sustain and/or enhance wildlife habitat and biodiversity, while improving timber quality and increasing non-timber opportunities on the woodlot.

Prince Edward Island also released *The State of the Forest Report, 1990-2000: Planning for the Future* in May 2003. The Report provides a snapshot of the Island's public and private forests, explores how they have changed over the last 10 years, suggests scenarios on how the changes might affect the province's economy and environment for decades to come, and recommends actions to influence these factors.

The federal government has renewed **Canada's Model Forest Program** for another five years. Over the past 10 years, the Program has made a substantial contribution to sustainable forest management practices in Canada through partnerships developed with industry, research groups, environmental and other nongovernmental organizations, Aboriginal and community groups and government. The focus over the next five years will be on building new partnerships, expanding activities beyond the boundaries of individual model forests (two pilot sites were established to study carbon accounting) and strengthening collective activities of the network (a Private Woodlot Strategic Initiative was developed to increase the participation of the broader woodlot community).

EXPANDING AND ENHANCING PROTECTED AREAS

The Government of **Saskatchewan** has proposed a Biodiversity Action Plan to help conserve the province's environment. This Action Plan builds on the Canadian Biodiversity Strategy and the efforts of industry and individuals. The focus is on government actions to conserve biodiversity and to use biological resources in a sustainable manner.

In 2002 the United Nations designated the Thousand Islands-Frontenac Arch region in Ontario as a **world biosphere reserve**. Biosphere reserves are areas of terrestrial and coastal ecosystems that promote solutions for reconciling the conservation of biodiversity with its sustainable use. They are also internationally recognized within the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Man and the Biosphere program. As of March 2003, there were 425 biosphere reserves in 95 countries. Twelve of these reserves are located in Canada.

In the past year, **Quebec** designated for protection 27 new areas covering approximately four million hectares. With that move, the proportion of Quebec's territory that is protected went from 2.90 percent to 5.31 percent in less than 12 months. The areas are representative of the biodiversity of their respective regions and also protect certain noteworthy river basins.

In April 2003 the *Protected Natural Areas Act* came into force in **New Brunswick**, providing more comprehensive legislation to manage and administer the province's entire network of protected natural areas. The government repealed the *Ecological Reserves Act* with the introduction of the new statute.

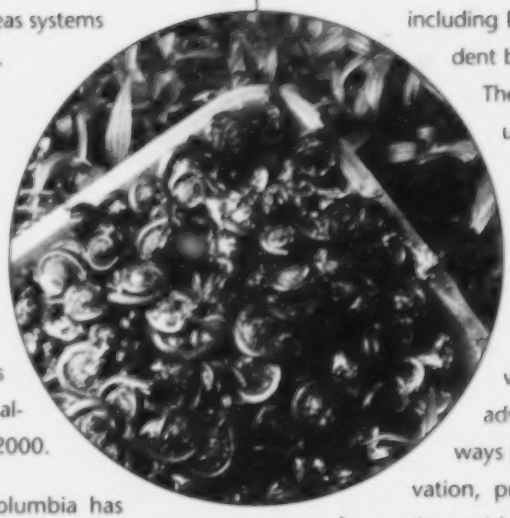
More than 1 500 hectares that are home to endangered species, rare plants and 135-year-old forests will join **Nova Scotia's** list of protected wilderness areas. The Nature Conservancy of Canada, Bowater Mersey Paper Co. Ltd. and the province announced a deal in February 2003 to protect four parcels of land in southwest Nova Scotia. Bowater donated two parcels and sold two others, all of which lie within areas already protected under the *Wilderness Areas Protection Act*.

Prince Edward Island gave notice that there would be no commercial cutting on suitable provincial forest lands from late May to late July in order to allow forest birds a measure of security during the nesting season. This new harvest policy was implemented on the 18 300 hectares of public forest land managed by the province's Department of Agriculture and Forestry.

In October 2002 the Government of Canada announced a five-year action plan to create 10 new **national parks** and five new marine conservation areas, as well as expand three existing national parks. This could expand the national park system by almost 50 percent, with the total system spanning an area nearly the size of Newfoundland and Labrador. The federal government will work with provinces and territories, Aboriginal and rural communities, industry, and environmental groups toward completing Canada's national parks and

national marine conservation areas systems for the benefit of all Canadians.

IDENTIFYING AND PROTECTING ENDANGERED SPECIES



Since May 2002, **British Columbia** has legally established over 75 Wildlife Habitat Areas to protect the habitats of species at risk. The province has created almost 200 such areas since June 2000.

The Government of British Columbia has also established recovery teams to develop conservation strategies for many forest-dependent species, including the woodland caribou, marbled murrelet and northern spotted owl. Recent evidence that there are fewer than 25 breeding pairs of spotted owls remaining in the southwestern part of the province prompted the establishment of a recovery team for that species. The team is expected to make recommendations within 18 months on how to protect and restore both the owl population and its habitat.

As part of its commitment to the *Accord for the Protection of Species at Risk* in Canada, **Nova Scotia** has published information on more than 1 600 wild plant species found in the province. Over the past four years, a team of scientists and experts from the provincial government, universities and conservation agencies assessed the general status of all known plant species that occur in Nova Scotia.

The Government of Nova Scotia has also added four species to the province's *Endangered Species Act*, including Bicknell's thrush, a forest-dependent bird listed as a "special concern". There are now a total of 20 species under the Act's protection.

The first Species at Risk Advisory Board in **Prince Edward Island** has been formed to identify species on the Island that need protection. The Advisory Board will also provide advice on habitat needs and on ways to engage the public in conservation, protection and recovery efforts for species at risk.

COMBATTING PESTS

Despite widespread efforts to control the mountain pine beetle, a mild winter has allowed the epidemic that has already devastated millions of hectares of forest in the central and northern regions of **British Columbia** to continue its expansion. The allowable annual cut was again increased to enable more harvesting of infested timber to reduce the rate of spread. In order to minimize the economic impact of the pine beetle infestation, in October 2002 the federal government announced a five-year investment program to assist the province in addressing the problem. (See also special article on page 62.) The potential threat to the Alberta forest industry along the eastern slopes may be significant, and monitoring efforts continue.

An exotic insect from eastern Asia, the emerald ash borer, is threatening to kill thousands of ash in the Windsor and Detroit areas of **Ontario** and Michigan.

A pest risk assessment conducted by the Canadian Food Inspection Agency concluded that the borer has potential economic and environmental significance and poses a risk to both urban and forested areas throughout much of eastern Canada and the United States.

At the urging of scientists and the general public, **New Brunswick's** Department of Natural Resources did not spray to ward off gypsy moth infestation in 2002. The hope was that a brutal winter and other natural factors would kill the tree-eating pest. Unfortunately, tests of gypsy moth egg masses taken from research sites revealed that most moth eggs survived the winter.

FIRE MANAGEMENT

Alberta experienced one of its highest fire seasons last year. In total, 1 447 fires burned over 496 000 hectares. One of these fires—the House River Fire—burned for eight months and scorched more than 238 000 hectares of forest since May 2002. Because of dry conditions in the province last year, the fire season began in March for Alberta's Department of Sustainable Resource Development. This was one month ahead of schedule.

After extensive public consultation, **Saskatchewan** developed a new policy framework for managing wildland fire and forest insects and diseases. The new policy encourages property owners and communities to reduce the danger of wildfire, and ensures that forest insect and disease management is fully integrated within land use and resource management plans.

In 2002 a particularly large area of **Quebec** was affected by forest fire, with a little over 232 000 hectares of forest being damaged in the intensive protection area, versus an annual rate for the last 10 years of just over 58 000. A plan was put in place to salvage 2 500 000 cubic metres of timber.

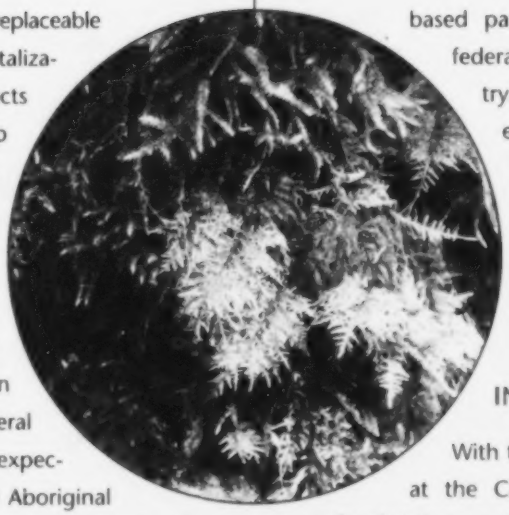
ABORIGINAL PARTICIPATION

The **Yukon's** most productive and extensive forestland base is located in the southeast part of the territory. Forest development in this area has been hampered, however, by outstanding land claims and poor timber markets. In 2002-2003 the Yukon government and the Kaska First Nation reached a deal that establishes a Kaska Forest Resources Stewardship Council, with a mandate to develop and advance forestry activities in southeastern Yukon.

Also in the Yukon, regional forest planning was initiated in the traditional territories of the Teslin Tlingit and Champagne-Aishihik First Nations, where land claims have been finalized. Completion of strategic planning documents is expected in 2003.

British Columbia introduced an initiative to increase First Nations participation in the forest sector and accelerate the treaty process. Through interim measures agreements, the government will provide First Nations with up to 5.5 million cubic metres of timber and $50 million in stumpage revenues annually. The timber was made available through the return to the

Crown of 20 percent of large replaceable tenures under the forestry revitalization plan. The province expects that these agreements will help accommodate First Nations interests in the land base and increase stability in the province's forest sector.



The **Alberta** Aboriginal Apprenticeship Project, announced in September 2002 by the federal and provincial governments, is expected to encourage at least 180 Aboriginal people to pursue careers in the trades, including forestry, over the next five years. This innovative project links potential employers with Aboriginal apprentices and offers additional assistance to help build successful working and learning relationships.

The Government of **Newfoundland and Labrador** and the Labrador Métis Nation (LMN) signed a memorandum of understanding that will facilitate Métis participation in the forest management planning process in Labrador. This agreement, announced in October 2002, formally recognizes the role of the LMN in forest ecosystem management and helps ensure that forest resources will continue to be developed sustainably and prudently, for the benefit of the region, the Métis people and the communities in which they live.

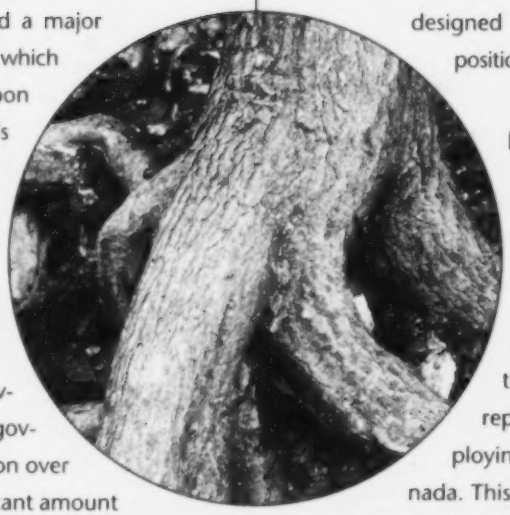
The Government of Canada renewed the **First Nations Forestry Program** in March 2003 for the five-year period from 2003 to 2008. During this time, the program will continue to financially assist projects that support its goals and objectives and to build a broad-based partnership with provincial and federal agencies and the forest industry. These partnerships will help enhance opportunities for First Nations participation in Canada's forest sector. The Program will continue to champion First Nations forestry in the provinces and territories.

INNOVATION

With the help of research conducted at the Canadian Forest Service, **CLC-Camint Inc.**, a Quebec-based forest company, has commercialized a mapping technique that can identify individual tree crowns in forest areas. Yielding a precise portrait of the forest cover, this new generation of digital maps (produced using high resolution satellite imagery) is designed to assist forestry professionals in developing more accurate inventories. It may also prove useful for monitoring forest cover fragmentation, optimizing forest fire management, assessing wildlife habitats and planning forest road networks.

Global Forest Watch launched the Pan-Boreal Mapping Initiative at the World Summit on Sustainable Development, held in Johannesburg in September 2002. This unique effort to map the last remaining wild lands of the boreal forest provides a detailed map of the forest, which spans Canada, Russia, Finland and Scandinavia. This high-resolution global map is designed to help identify areas of intact forest ideal for protection, and provide an accurate measure of the rate and extent of ecological changes in the boreal forest. The map may be updated every five years for monitoring purposes.

In May 2002, Canada initiated a major project, called **Fluxnet-Canada**, which is designed to quantify the carbon exchanges between forestlands and the atmosphere. Seven study stations have been established across the country, each one covering a variety of ecosites and forest types. The research work is carried out by a partnership of university and government scientists. The federal government has devoted $13 million over the next five years and a significant amount of its own scientists' time to this research project. (See also special article on page 60.)



As part of its efforts to enhance forest-sector innovation, in 2002 the Government of Canada announced a five-year **Value-Added Research Initiative** for Wood Products aimed at helping small and medium-sized enterprises in the value-added wood products sector to improve their competitiveness and skills, develop new products and applications, and help move forest products up the value-added chain. The funding provides resources for research to be conducted by a consortium formed by Forintek Canada Corp. (Forintek) and the universities of British Columbia, Laval and New Brunswick.

In 2002, the federal government also announced funding for Canada's three **national forest research institutes** (Forintek, the Forest Engineering Research Institute of Canada and the Pulp and Paper Research Institute of Canada). This special, one-time funding will help to ensure the longer-term capacity of these institutes and will be directed toward projects designed to strengthen the competitive position of the Canadian forest industry.

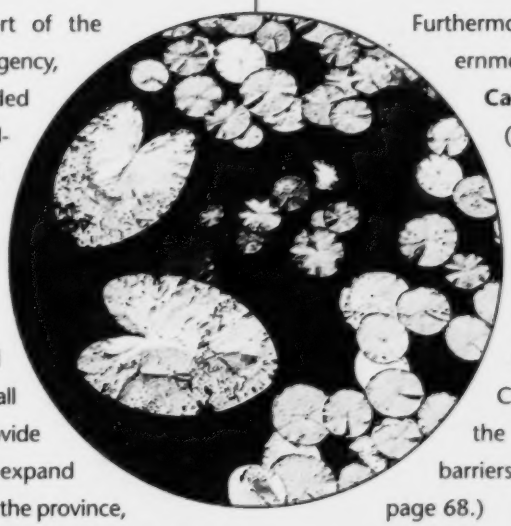
INDUSTRY AND COMMERCE

As announced in September 2002, the Wood Products Group in **New Brunswick** will create a web-based business-to-business portal for members representing 150 companies employing 5 000 people in Atlantic Canada. This e-commerce initiative is aimed at creating business advantages for companies in the value-added wood products industry. The web portal will provide a wide range of tools and services to stimulate the use of e-commerce, develop new markets at low cost, facilitate online communication and collaboration with business partners, and increase efficiency, productivity, and profitability.

In August 2002, an e-business research consortium for the forest products industry, **FOR@C**, received funding from public and private sector partners for the development of knowledge and capacity in the integration of electronic products and procedures. The consortium, which is based at Université Laval in Quebec, will act as a Canadian and international reference. It will employ the newest technologies and electronic business models to enable the forest products industry to benefit from marketing, product development, distribution and technology implementation strategies.

In **Newfoundland and Labrador**, the Department of Forest Resources and Agrifoods and the Forestry Training

Association, with the support of the Atlantic Canada Opportunities Agency, announced a major value-added initiative in January 2003. Funding from federal and provincial sources will be used over the next two years to coordinate and further diversify the province's secondary wood products industry. This initiative will promote cooperation among small independent companies and provide collective marketing services to expand markets both inside and outside the province, as well as focusing on niche market opportunities.



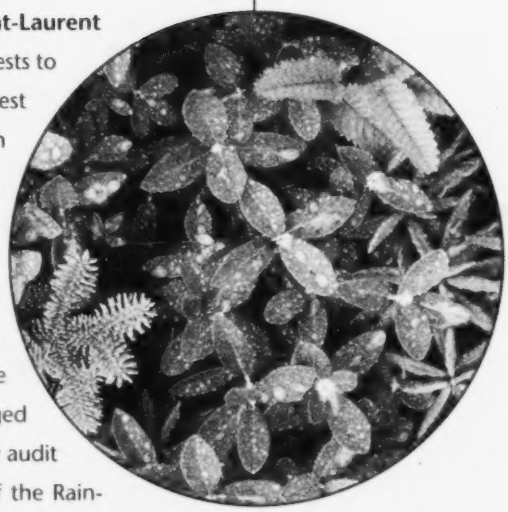
In May 2002, the United States imposed combined countervailing and anti-dumping duties of 27.22 percent on imports of Canadian **softwood lumber** (shipments from the Atlantic provinces are subject only to the 8.43 percent anti-dumping duty). The federal, provincial and territorial governments and the Canadian forest industry are responding on several fronts. First, they are appealing the US actions at the World Trade Organization (WTO) and under the North American Free Trade Agreement. On May 27 of this year, a WTO panel issued a confidential interim report that supports Canada's claim that its lumber is not subsidized. The final report of the WTO panel will be made public in July. Second, governments and industry are engaging in discussions with the US aimed at reaching a durable resolution to this long-standing trade dispute. Third, they are increasing efforts to educate US consumers and policy makers about the effects of the duties, and are working to develop non-US markets for Canadian forest products.

Furthermore, in May of 2002, the Government of Canada launched the **Canada Wood Export Program** (Canada Wood), designed to respond to the challenges confronting the sector as a result of substitute products, aggressive low-cost competitors and restrictive trade practices such as the United States' tariffs on Canadian softwood lumber and the European Union's plant health barriers. (See also special article on page 68.)

In December of the same year, the federal government also announced the implementation of the **Softwood Industry and Community Economic Adjustment Initiative**. This initiative is designed to address the adjustment and transition needs of forest-dependent communities across Canada that are experiencing long-term employment declines as a result of the US tariffs. Funding is targeted at innovative and value-added forestry initiatives; community capacity building; diversifying local economies; and developing infrastructure that encourages economic growth.

CERTIFICATION

In November 2002 the **Ontario** Ministry of Natural Resources signed a memorandum of understanding with the Standards Council of Canada (SCC) for cooperation and mutual recognition of each other's requirements in the area of forest certification. The goal of this agreement is to complement the strengths of both organizations and streamline processes.



Eastern Ontario and **Bas-Saint-Laurent** are the first Canadian model forests to attain Resource Manager Forest Certification in accordance with the principles and criteria of the Forest Stewardship Council (FSC). And in northern Ontario, the first boreal certification in Canada was granted under the FSC certification system to the **Gordon Cosens Forest**, managed by Tembec, after a sustainability audit by the SmartWood Program of the Rainforest Alliance. At two million hectares, this makes it also the largest FSC forest certification in North America to date.

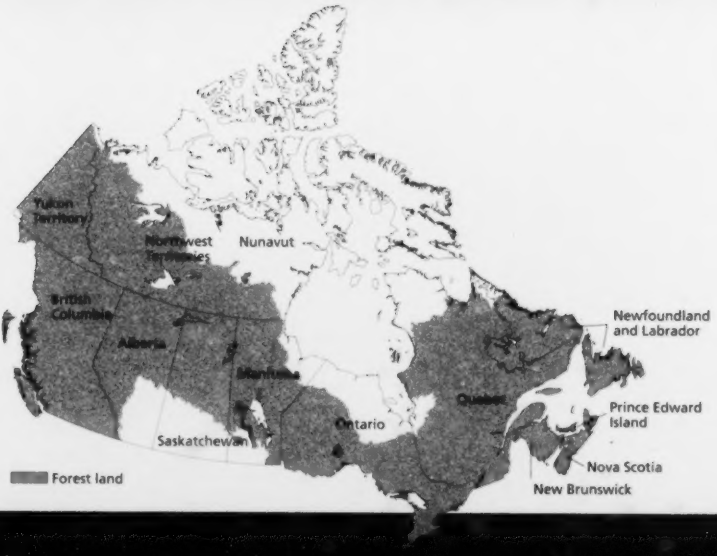
A new survey of certification intentions released by the **Forest Products Association of Canada** indicates that certification under the three forestry-specific schemes used in Canada will cover 137 million hectares by the end of 2006. There are currently 17.5 million hectares certified under the Canadian Standards Association Forest Standard, 22.8 million under the Sustainable Forest Initiative and 3 million under the Forest Stewardship Council, for a total of 43.3 million hectares.

PROFILES
ACROSS THE NATION

ARBOREAL EMBLEMS

B.C.	Alta.	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	Nfld. & Lab.	Y.T.	N.W.T.
WESTERN RED CEDAR	LODGE-POLE PINE	WHITE BIRCH	WHITE SPRUCE	EASTERN WHITE PINE	YELLOW BIRCH	BALSAM FIR	RED SPRUCE	RED OAK	BLACK SPRUCE	SUB-ALPINE FIR	JACK PINE

PROFILES
ACROSS THE NATION



ARBOREAL EMBLEMS

B.C.	Alta.	Sask.	Man.	Ont.	Que.	N.B.	N.S.	P.E.I.	Nfld. & Lab.	Y.T.	N.W.T.
WESTERN RED CEDAR	LODGE-POLE PINE	WHITE BIRCH	WHITE SPRUCE	EASTERN WHITE PINE	YELLOW BIRCH	BALSAM FIR	RED SPRUCE	RED OAK	BLACK SPRUCE	SUB-ALPINE FIR	JACK PINE

Note: Nunavut does not have an arboreal emblem

CANADA (MAPLE TREE)

Population (2002)	Forest land
31.4 million	417.6 million ha
Total area	**National parks**
997 million ha	24.5 million ha
Land area	**Provincial parks**
921.5 million ha	33.2 million ha

FOREST RESOURCE

Ownership	
Federal	23%
Private	6%
Provincial	71%
Forest type	
Hardwood	15%
Mixedwood	18%
Softwood	67%
Annual allowable cut (2000)[a]	232.9 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	200.4 million m^3
Harvest (area) Industrial roundwood (2000)	1.03 million ha
Status of harvested Crown land (2000)[c]	
Stocked (85%)	15.1 million ha
Understocked (15%)	2.6 million ha
Area defoliated by insects (2001)[d]	18.6 million ha
Area burned (2002)[e]	2.8 million ha

FOREST INDUSTRY

Value of exports (2002)	$42.9 billion
Converted paper	2%
Newsprint	15%
Other paper and paperboard	17%
Other products	22%
Softwood lumber	24%
Waferboard	4%
Wood pulp	16%
Major export markets (2002)	
European Union	6%
Japan	6%
Other countries	7%
South and Central America	1%
United States	80%
Balance of trade (2002)	$32.6 billion
Contribution to GDP (gross domestic product) (2002)	$29.9 billion
Value of shipments (2001)	not available
Exported	not available
Sold domestically	not available
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	850
Wood product manufacturing (2001)	3 740
Direct jobs (2002)	361 400
Wages and salaries (2001)	not available
New investments (2002)	$2.7 billion

a, b, c, d, e see page 25

Population
4.1 million

Total area
94.8 million ha

Land area
93 million ha

Forest land
60.6 million ha

Provincial parks
11.3 million ha

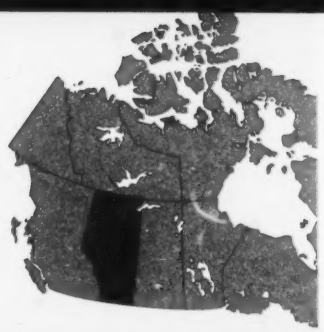
Population
3.1 million

Total area
66.1 million ha

Land area
64.4 million ha

Forest land
38.2 million ha

Provincial parks
1.9 million ha



BRITISH COLUMBIA

FOREST RESOURCE

Ownership	
Federal	1%
Private	4%
Provincial	95%
Forest type	
Hardwood	3%
Mixedwood	8%
Softwood	89%
Annual allowable cut (2000)[a]	74 million m^3
Harvest (volume) Industrial roundwood (2001)[b]	73.6 million m^3
Harvest (area) Industrial roundwood (2000)	204 472 ha
Status of harvested Crown land (2000)[c]	
Stocked (82%)	3.4 million ha
Understocked (18%)	735 000 ha
Area defoliated by insects (2001)[d]	not available
Area burned (2002)	8 604 ha

FOREST INDUSTRY

Value of exports (2002)	$13.9 billion
Newsprint	5%
Other paper and paperboard	10%
Other products	17%
Softwood lumber	46%
Waferboard	3%
Wood pulp	19%
Major export markets (2002)	
European Union	8%
Japan	15%
Other countries	11%
South and Central America	1%
United States	65%
Balance of trade (2002)	$12.6 billion
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$6.3 billion
Wood product manufacturing (2001)	$10.8 billion
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	85
Wood product manufacturing (2001)	900
Direct jobs (2002)	87 300
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$871.9 million
Wood product manufacturing (2001)	$1.7 billion
New investments (2002)	$0.5 billion

ALBERTA

FOREST RESOURCE

Ownership	
Federal	9%
Private	4%
Provincial	87%
Forest type	
Hardwood	33%
Mixedwood	23%
Softwood	44%
Annual allowable cut (2000)[a]	27.4 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	21.9 million m^3
Harvest (area) Industrial roundwood (2000)	65 300 ha
Status of harvested Crown land (2000)[c]	
Stocked	not available
Understocked	not available
Area defoliated by insects (2001)[d]	3.6 million ha
Area burned (2002)	496 566.7 ha

FOREST INDUSTRY

Value of exports (2002)	$2.8 billion
Newsprint	6%
Other paper and paperboard	1%
Other products	10%
Softwood lumber	24%
Waferboard	14%
Wood pulp	45%
Major export markets (2002)	
European Union	6%
Japan	9%
Other countries	15%
United States	70%
Balance of trade (2002)	$2.5 billion
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$1.7 billion
Wood product manufacturing (2001)	$2.6 billion
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	35
Wood product manufacturing (2001)	286
Direct jobs (2002)	20 000
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$206.1 million
Wood product manufacturing (2001)	$443.4 million
New investments (2002)	$0.2 billion

Population
1 million

Total area
65.2 million ha

Land area
57.1 million ha

Forest land
28.8 million ha

Provincial parks
1.2 million ha

Population
1.2 million

Total area
65 million ha

Land area
54.8 million ha

Forest land
26.3 million ha

Provincial parks
3.4 million ha

SASKATCHEWAN

FOREST RESOURCE

Ownership	
Federal	2%
Private	1%
Provincial	97%
Forest type	
Hardwood	36%
Mixedwood	25%
Softwood	39%
Annual allowable cut (2000)[a]	0.8 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	4.5 million m^3
Harvest (area) Industrial roundwood (2000)	21 169 ha
Status of harvested Crown land (2000)[c]	
Stocked	not available
Understocked	not available
Area defoliated by insects (2001)[d]	438 883 ha
Area burned (2002)	879 582.6 ha

FOREST INDUSTRY

Value of exports (2002)	$631.9 million
Converted paper	2%
Other paper and paperboard	15%
Other products	14%
Softwood lumber	17%
Waferboard	7%
Wood pulp	45%
Major export markets (2002)	
European Union	13%
Japan	3%
Other countries	13%
United States	71%
Balance of trade (2002)	$521.7 million
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$493.3 million
Wood product manufacturing (2001)	$314.9 million
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	9
Wood product manufacturing (2001)	59
Direct jobs (2002)	4 800
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$76.2 million
Wood product manufacturing (2001)	$64.3 million
New investments (2002)	not available

MANITOBA

FOREST RESOURCE

Ownership	
Federal	1%
Private	5%
Provincial	94%
Forest type	
Hardwood	21%
Mixedwood	20%
Softwood	59%
Annual allowable cut (2000)[a]	9.7 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	2.2 million m^3
Harvest (area) Industrial roundwood (2000)	15 633 ha
Status of harvested Crown land (2001)[c]	
Stocked (95%)	308 000 ha
Understocked (5%)	15 000 ha
Area defoliated by insects (2001)[d]	not available
Area burned (2002)	81 174 ha

FOREST INDUSTRY

Value of exports (2002)	$615.4 million
Converted paper	4%
Newsprint	22%
Other paper and paperboard	14%
Other products	33%
Softwood lumber	14%
Waferboard	13%
Major export markets (2002)	
Other countries	1%
United States	99%
Balance of trade (2002)	$223.6 million
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$549.1 million
Wood product manufacturing (2001)	$623 million
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	30
Wood product manufacturing (2001)	76
Direct jobs (2002)	7 300
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$104.5 million
Wood product manufacturing (2001)	$118.3 million
New investments (2002)	not available

Population
12.1 million

Total area
106.9 million ha

Land area
89.1 million ha

Forest land
58 million ha

Provincial parks
7.2 million ha

ONTARIO

FOREST RESOURCE

Ownership	
Federal	1%
Private	11%
Provincial	88%
Forest type	
Hardwood	23%
Mixedwood	27%
Softwood	50%
Annual allowable cut (2000)[a]	0.3 million ha
Harvest (volume) Industrial roundwood (2000)[b]	28.1 million m^3
Harvest (area) Industrial roundwood (2000)	176 668 ha
Status of harvested Crown land (2001)[c]	
Stocked (88%)	4.3 million ha
Understocked (12%)	597 000 ha
Area defoliated by insects (2001)[d]	13.5 million ha
Area burned (2002)	172 512 ha

FOREST INDUSTRY

Value of exports (2002)	$9.3 billion
Converted paper	7%
Newsprint	15%
Other paper and paperboard	20%
Other products	32%
Softwood lumber	9%
Waferboard	6%
Wood pulp	11%
Major export markets (2002)	
European Union	1%
Other countries	2%
United States	97%
Balance of trade (2002)	$3.2 billion
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$11 billion
Wood product manufacturing (2001)	$5.7 billion
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	385
Wood product manufacturing (2001)	912
Direct jobs (2002)	86 200
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$1.8 billion
Wood product manufacturing (2001)	$1 billion
New investments (2002)	$0.5 billion

Population
7.5 million

Total area
154.1 million ha

Land area
135.7 million ha

Forest land
83.9 million ha

Provincial parks
7.2 million ha

QUEBEC

FOREST RESOURCE

Ownership	
Private	11%
Provincial	89%
Forest type	
Hardwood	19%
Mixedwood	23%
Softwood	58%
Annual allowable cut (2000)[a]	58 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	43.5 million m^3
Harvest (area) Industrial roundwood (2000)	349 113 ha
Status of harvested Crown land (2000)[c]	
Stocked (96%)	5.6 million ha
Understocked (4%)	208 000 ha
Area defoliated by insects (2001)[d]	1.1 million ha
Area burned (2002)	1 million ha

FOREST INDUSTRY

Value of exports (2002)	$11.6 billion
Converted paper	3%
Newsprint	23%
Other paper and paperboard	25%
Other products	25%
Softwood lumber	14%
Waferboard	3%
Wood pulp	7%
Major export markets (2002)	
European Union	7%
Other countries	4%
South and Central America	1%
United States	88%
Balance of trade (2002)	$9.6 billion
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$12 billion
Wood product manufacturing (2001)	$8 billion
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	251
Wood product manufacturing (2001)	1 129
Direct jobs (2002)	122 700
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$1.6 billion
Wood product manufacturing (2001)	$1.3 billion
New investments (2002)	$1 billion

Population
756 652
Total area
7.3 million ha
Land area
7.2 million ha
Forest land
6.1 million ha
Provincial parks
23 451 ha

NEW BRUNSWICK

FOREST RESOURCE

Ownership	
Federal	1%
Private	51%
Provincial	48%
Forest type	
Hardwood	24%
Mixedwood	29%
Softwood	47%
Annual allowable cut (2000)[a]	11.1 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	11.9 million m^3
Harvest (area) Industrial roundwood (2000)	111 533 ha
Status of harvested Crown land (2000)[c]	
Stocked (95%)	606 000 ha
Understocked (5%)	33 000 ha
Area defoliated by insects (2001)[d]	760 ha
Area burned (2002)	246.4 ha

FOREST INDUSTRY

Value of exports (2002)	$2.4 billion
Converted paper	2%
Newsprint	10%
Other paper and paperboard	28%
Other products	14%
Softwood lumber	22%
Waferboard	3%
Wood pulp	21%
Major export markets (2002)	
European Union	7%
Japan	3%
Other countries	7%
South and Central America	1%
United States	82%
Balance of trade (2002)	$2.1 billion
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$2.2 billion
Wood product manufacturing (2001)	$1.4 billion
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	27
Wood product manufacturing (2001)	165
Direct jobs (2002)	17 300
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$307 million
Wood product manufacturing (2001)	$217.3 million
New investments (2002)	not available

Population
944 765
Total area
5.6 million ha
Land area
5.3 million ha
Forest land
3.9 million ha
Provincial parks
30 507 ha

NOVA SCOTIA

FOREST RESOURCE

Ownership	
Federal	3%
Private	69%
Provincial	28%
Forest type	
Hardwood	33%
Mixedwood	22%
Softwood	45%
Annual allowable cut (2000)[a]	6.7 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	6.2 million m^3
Harvest (area) Industrial roundwood (2000)	54 433 ha
Status of harvested Crown land (2000)[c]	
Stocked (97%)	197 000 ha
Understocked (3%)	6 300 ha
Area defoliated by insects (2001)[d]	0 ha
Area burned (2002)	211.25 ha

FOREST INDUSTRY

Value of exports (2002)	$1 billion
Converted paper	1%
Newsprint	25%
Other paper and paperboard	26%
Other products	10%
Softwood lumber	20%
Wood pulp	18%
Major export markets (2002)	
European Union	9%
Other countries	6%
South and Central America	7%
United States	78%
Balance of trade (2002)	$981.9 million
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$1.04 billion
Wood product manufacturing (2001)	$527.6 million
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	14
Wood product manufacturing (2001)	126
Direct jobs (2002)	11 700
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	$132.2 million
Wood product manufacturing (2001)	$88.4 million
New investments (2002)	not available

Population
139 913
Total area
0.57 million ha
Land area
0.57 million ha
Forest land
0.29 million ha
Provincial parks
1 500 ha

PRINCE EDWARD ISLAND

FOREST RESOURCE

Ownership	
Federal	1%
Private	92%
Provincial	7%
Forest type	
Hardwood	30%
Mixedwood	35%
Softwood	35%
Annual allowable cut (2000)[a]	0.5 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	0.7 million m^3
Harvest (area) Industrial roundwood (2000)	5 510 ha
Status of harvested Crown land (2001)[c]	
Stocked (100%)	54 800 ha
Area defoliated by insects (2001)[d]	0 ha
Area burned (2002)	132.3 ha

FOREST INDUSTRY

Value of exports (2002)	$14.9 million
Converted paper	1%
Other paper and paperboard	1%
Other products	8%
Softwood lumber	90%
Major export markets (2002)	
Other countries	1%
South and Central America	2%
United States	97%
Balance of trade (2002)	$14.8 million
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	not available
Wood product manufacturing (2001)	$43.5 million
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	5
Wood product manufacturing (2001)	15
Direct jobs (2002)	600
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	not available
Wood product manufacturing (2001)	$8 million
New investments (2002)	not available

Population
531 595
Total area
40.6 million ha
Land area
37.2 million ha
Forest land
22.5 million ha
Provincial parks
439 400 ha

NEWFOUNDLAND AND LABRADOR

FOREST RESOURCE

Ownership	
Private	1%
Provincial*	99%
Forest type	
Hardwood	1%
Mixedwood	8%
Softwood	91%
Annual allowable cut (2000)[a]	2.7 million m^3
Harvest (volume) Industrial roundwood (2000)[b]	2.9 million m^3
Harvest (area) Industrial roundwood (2000)	23 216 ha
Status of harvested Crown land (2000)[c]	
Stocked (81%)	343 000 ha
Understocked (19%)	80 000 ha
Area defoliated by insects (2001)[d]	0 ha
Area burned (2002)	35 484 ha

FOREST INDUSTRY

Value of exports (2002)	$782 million
Newsprint	96%
Softwood lumber	4%
Major export markets (2002)	
European Union	26%
Other countries	12%
South and Central America	9%
United States	53%
Balance of trade (2002)	$765.1 million
Value of shipments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	not available
Wood product manufacturing (2001)	$103 million
Number of establishments (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	9
Wood product manufacturing (2001)	72
Direct jobs (2002)	3 500
Wages and salaries (2001)	not available
Logging (2001)	not available
Paper manufacturing (2001)	not available
Wood product manufacturing (2001)	$19.5 million
New investments (2002)	not available

**Timber and property rights for 69% of the Crown land on the island of Newfoundland has been conveyed to pulp and paper companies through 99 year licences issued under the 1905 Pulp and Paper Manufacturing Act and 1935 Bowater Act. Therefore, the Province's financial and legal system treats this licensed land as private property.*

Population
29 924

Total area
48.3 million ha

Land area
47.9 million ha

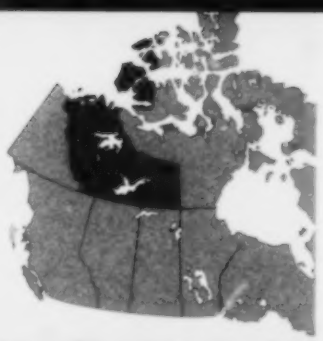
Forest land
27.5 million ha

Population
41 403

Total area
342.6 million ha

Land area
329.3 million ha

Forest land
61.4 million ha



YUKON

FOREST RESOURCE

Ownership	
Federal	100%
Forest type	
Hardwood	2%
Mixedwood	19%
Softwood	79%
Annual allowable cut (2000)[a]	275 200 m^3
Harvest (volume) Industrial roundwood (2001)[b]	36 000 m^3
Harvest (area) Industrial roundwood (2000)	14 ha
Status of harvested Crown land (2001)[c]	
Stocked (45%)	5 700 ha
Understocked (55%)	7 000 ha
Area defoliated by insects (2001)[d]	not available
Area burned (2002)	35 700 ha

FOREST INDUSTRY

Value of exports (2002)	$691 211
Other products	99%
Waferboard	1%
Major export markets (2002)	
United States	100%
Balance of trade (2002)	$568 749

NORTHWEST TERRITORIES

FOREST RESOURCE

Ownership	
Federal	100%
Forest type	
Hardwood	9%
Mixedwood	58%
Softwood	33%
Annual allowable cut (2000)[a]	236 500 m^3
Harvest (volume) Industrial roundwood (2000)[b]	71 271 m^3
Harvest (area) Industrial roundwood (2000)	50 ha
Status of harvested Crown land (2000)[c]	
Stocked	not available
Understocked	not available
Area defoliated by insects (2001)[d]	not available
Area burned (2002)	27 089.2 ha

FOREST INDUSTRY

Value of exports (2002)	$110 548
Converted paper	78%
Other paper and paperboard	11%
Other products	5%
Softwood lumber	6%
Major export markets (2002)	
Cuba	78%
United States	22%
Balance of trade (2002)	$110 483

NUNAVUT

FOREST INDUSTRY

Value of exports (2002)	$580
Other products	100%
Major export markets (2002)	
Saint Kitts and Nevis	5%
South Africa	95%

Population
28 715

Total area
199.4 million ha

NOTES

DATA SOURCES

The main sources for the data are Statistics Canada, Environment Canada, the Forest Products Association of Canada, Natural Resources Canada–Canadian Forest Service, the National Forestry Database and the Canadian Interagency Forest Fire Centre. Most of the information for the National Forestry Database was collected by provincial and territorial natural resource ministries. At the time of publication, data were preliminary. As data are finalized, they will be made available on the Internet in the National Forestry Database *(http://nfdp.ccfm.org)*.

In 2000, major conceptual and methodological changes were incorporated into the Annual Survey of Manufacturers (ASM). With reference year 2000, the universe was expanded to cover all manufacturing units. In addition to the incorporated manufacturing businesses over $30,000 in sales of manufactured goods and with employees, the new ASM also includes: a) all incorporated businesses under $30,000 that had employees; b) all incorporated businesses that did not have any employees regardless of their annual sales value; and c) all unincorporated businesses. *(Reference: CANSIM Tables 301-0003 and 301-0005 at http://cansim2.statcan.ca)*.

Beginning with reference year 2000, data for Head Offices are no longer included, which affects the following variables: administration employees, salaries, total employees, salaries and wages, cost of materials, supplies and goods for resale, value of shipments, and other revenue and total value added. Note: In 1999, Head Offices account for three percent of the total number of employees and seven percent of the total value of shipments and other revenue.

FOREST LAND

The data regarding Canada's forest land are based on Canada's Forest Inventory 1991 (revised 1994).

FOREST RESOURCE

Ownership data are provided for the total forest land.

[a] Annual allowable cut (AAC): The level of harvest set by the provinces and territories for a year. AAC figures include data for both softwoods and hardwoods. The AAC figures for Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Manitoba include federal, provincial and private lands. Given the differences outlined below, a national AAC cannot be calculated by simply adding the provincial and territorial AACs.

- The national AAC figure was arrived at by estimating some data for private and federal lands, and converting the Ontario area figures into volume figures.
- Ontario provides figures for AAC (which it refers to as the "maximum allowable depletion") in hectares only.
- Alberta and Ontario do not include figures for private lands in their AACs.
- Saskatchewan's figures include federal land only.
- British Columbia does not include all private lands in its AAC.

[b] Harvesting: The national and provincial figures for harvesting volume include data for industrial roundwood only. The harvest level for fuelwood or firewood for a single province may range as high as 2.2 million cubic metres, and is not included in these harvest figures.

- Although the AAC for British Columbia does not include all private lands, these lands are included in the harvest figure. The yearly harvest rate for British Columbia may fluctuate, and in some cases, it may exceed the AAC. Over a five-year period, however, the harvest figure would be equal to or lower than the AAC.

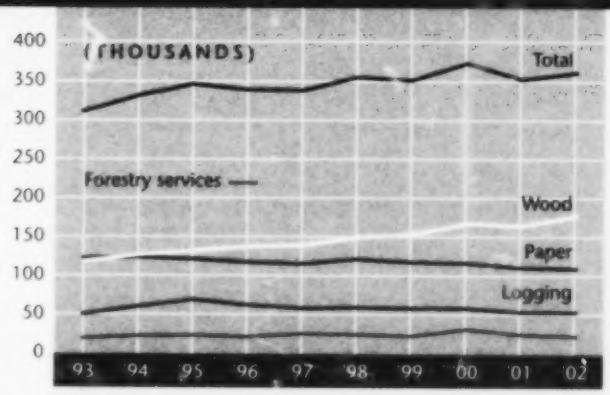
[c] Status of harvested Crown land: These data reflect the cumulative area harvested since 1975. Except for Prince Edward Island, data for private lands are not included. The term "stocked" refers to land where the forest cover meets certain timber-production standards established by forest management agencies in each province and territory. The term "understocked" refers to harvested land that requires silviculture treatments, such as site preparation, planting, seeding or weeding, to meet established standards. This category also includes land that has not yet been surveyed. A significant proportion of recently harvested areas will always be reported as understocked because of the time lag between harvesting and observable results of subsequent treatments. The small percentage of the area harvested each year that is devoted to access roads is not included in these data.

[d] Insect defoliation: The data relating to insects were provided by provincial and territorial agencies, and they include moderate-to-severe defoliation only. Defoliation does not always imply mortality; for example, stands with moderate defoliation often recover and may not lose much growth. Also, defoliation is mapped on an insect species basis, and a given area may be afflicted by more than one insect at a time. This may result in double or triple counting in areas affected by more than one insect, exaggerating the extent of the total area defoliated.

[e] All "Area burned" figures are from the Canadian Interagency Forest Fire Centre. Area burned includes areas within National Parks.

FORESTRY STATISTICS

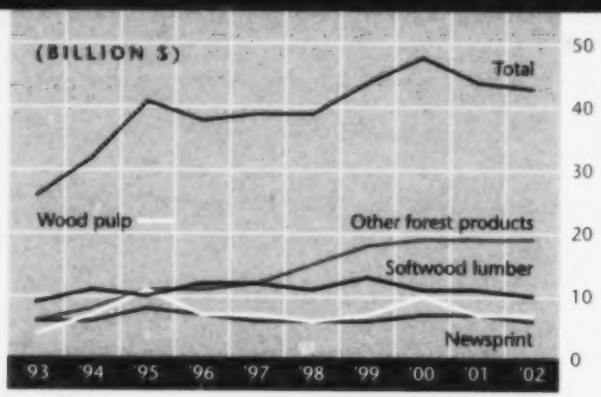
DIRECT EMPLOYMENT



Despite countervail and anti-dumping duties imposed by the United States on Canadian softwood lumber, the wood industry employed nearly 13 000 more workers in 2002 than in the previous year. On the other hand, the pulp and paper, logging and forest services industries employed almost 4 000 fewer workers. That translates to an overall increase of 9 000 jobs for the entire forest sector. This is consistent with the trend observed over the last ten years or more whereby the wood industry has been expanding in terms of employment, while productivity gains in the pulp and paper industry are reducing the number of jobs it has to offer. There has been an increase of 59 000 jobs in the wood industry over the last decade, while there has been a decrease of close to 13 000 in the pulp and paper industry. In total, 361 400 people were working directly for the forest sector in 2002, which is 12 000 fewer than the record set in 2000.

2002	Person-years	Annual change (%) 1 year	10 years
Total	361,400	2.4	1.5
Wood product manufacturing	177,300	7.9	4.1
Paper manufacturing	109,200	-1.2	-1.1
Logging	52,900	-1.4	0.4
Forestry services	22,000	-9.6	1.0

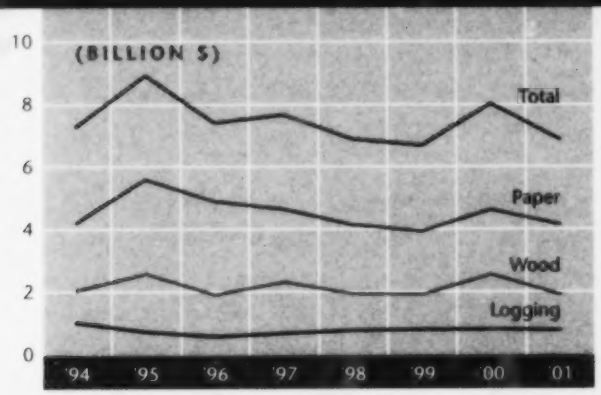
EXPORTS OF FOREST PRODUCTS



Prices for forest markets are set on international markets. In 2002, global overproduction led to lower prices for pulp, newsprint and softwood lumber than in the previous year. This decreased the value of their exports. Because these three products account for more than half of Canadian forest product exports, there was a resulting decrease in the overall value of exports. The value of Canadian exports of forest products went from $44.7 billion in 2001 to $42.9 billion in 2002. Analysts expect higher prices in 2003, which should have a positive impact on the value of exports.

2002	Billion $	Annual change (%) 1 year	10 years
Total	42.9	-3.9	4.9
Other forest products	19.5	-1.7	11.1
Softwood lumber	10.3	-6.6	1.2
Wood pulp	6.8	-6.1	3.9
Newsprint	6.3	-12.7	0.4

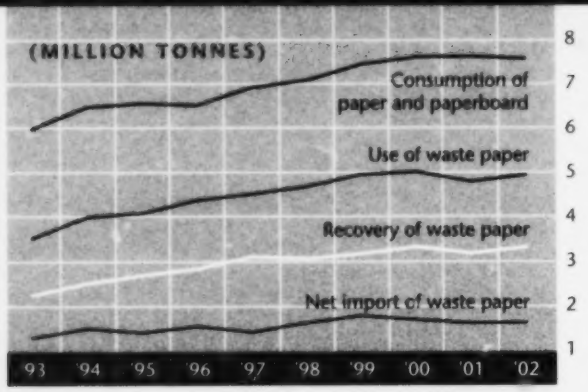
CAPITAL AND REPAIR EXPENDITURES



New investments, or capital expenditures, decreased in 2001, while expenditures on repairs increased over the year 2000. Total capital and repair expenditures for the forest sector were $6.9 billion in 2001, which was $1.1 billion less than in 2000. Being more capital intensive than the wood or logging industries, the pulp and paper industry was responsible for almost two thirds of capital and repair expenditures for the forest sector.

2001	Billion $	Annual change (%) 1 year	5 years
Total	6.9	-14.1	-2.1
Wood product manufacturing	1.9	-24.9	-3.7
Paper manufacturing	4.2	-10.1	-2.2
Logging	0.8	-2.8	2.8

RECYCLING OF WASTE PAPER AND PAPERBOARD

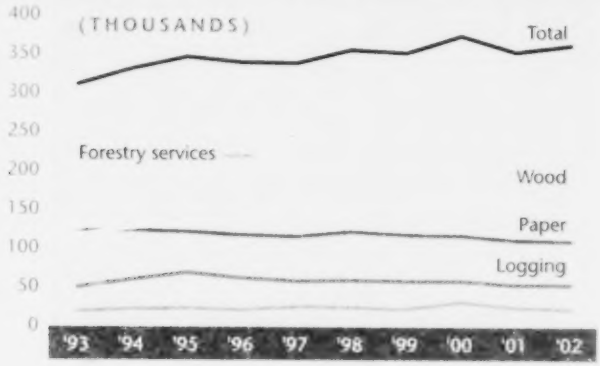


Since the year 2000, Canadian consumption of paper and paperboard has been about 7.6 million tonnes per year. A total of 3.3 million tonnes of waste paper and paperboard were recovered in 2002; a recovery rate of 44%. That is not enough to meet the needs of Canadian industry, which each and every year recycles more than 4.9 million tonnes of waste paper and paperboard. The Canadian industry is therefore obliged to import 1.6 million tonnes of waste paper and paperboard for recycling in this country.

2002	Million tonnes	Annual change (%) 1 year	10 years
Consumption of paper and paperboard	7.6	-0.8	2.6
Recovery of waste paper	3.3	4.3	4.8
Use of waste paper	4.9	3.1	4.0
Net import of waste paper	1.6	0.7	2.7

FORESTRY
STATISTICS

DIRECT EMPLOYMENT



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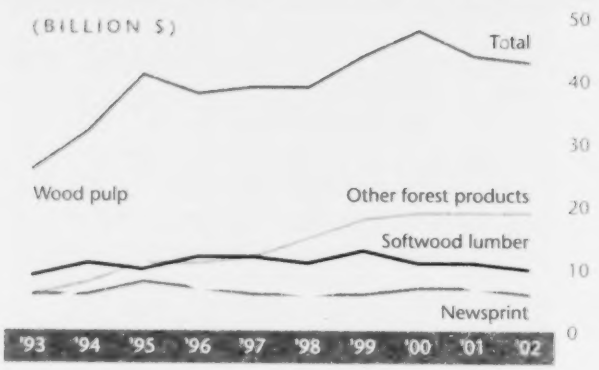

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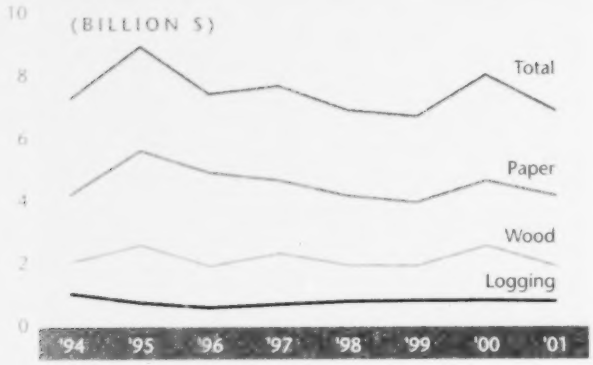

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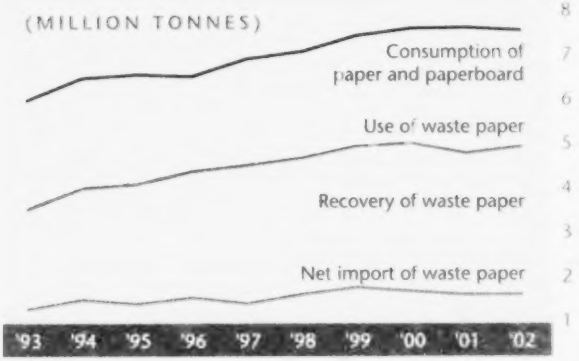

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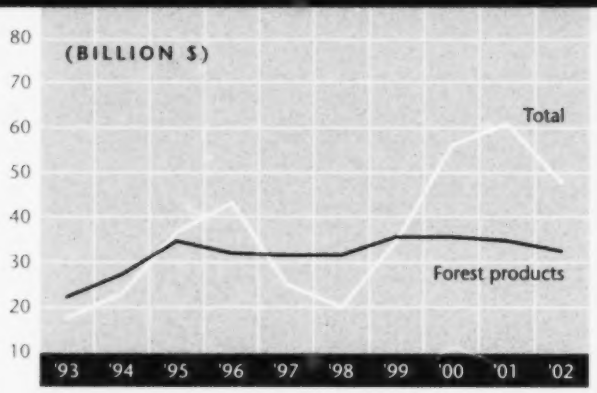
2002	Million tonnes	Annual change (%) 1 year	10 years
Consumption of paper and paperboard	7.6	-0.8	2.6
Recovery of waste paper	3.3	4.3	4.8
Use of waste paper	4.9	3.1	4.0
Net import of waste paper	1.6	0.7	2.7

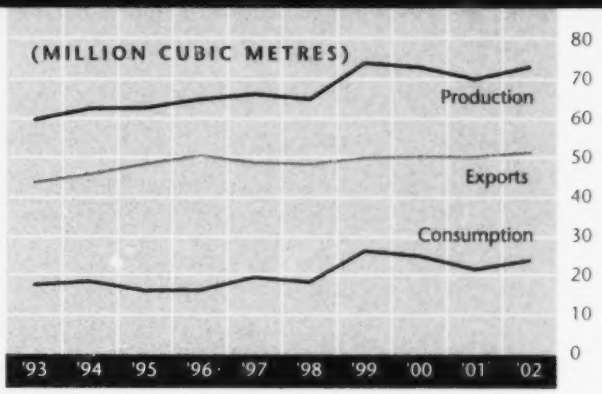
TRADE BALANCE



A country's balance of trade is the value of its exports less the value of its imports. Canada has had a positive trade balance for a number of years, which means that we export more than we import. In 2002, for all goods, the Canadian balance of trade was close to $47.9 billion. For forest products alone, the balance of trade was $32.6 billion. Forest products contribute more to Canada's balance of trade than any other products.

2002	Billion $	Annual change (%)	
		1 year	10 years
Trade balance	47.9	-21.4	10.5
Forest products' contribution	32.6	-6.6	3.9

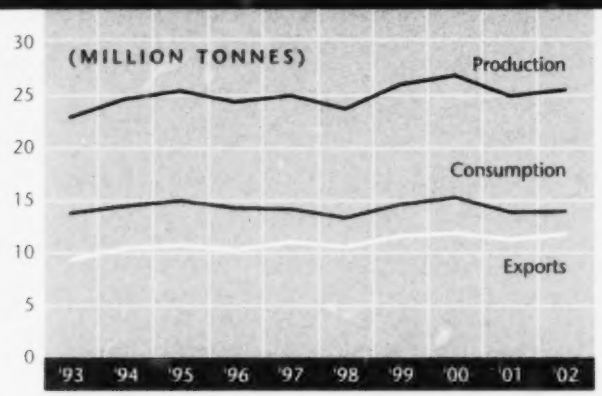
LUMBER



Canada is the second largest producer and the main exporter of softwood lumber in the world. In May of 2002, the American government imposed countervail and anti-dumping duties on Canadian softwood lumber. Despite those duties as well as slumping prices, Canada experienced a record volume of exports of softwood lumber. Prices were too low, however, for that to translate into an increased value of softwood lumber exports. The increase in residential construction in Canada led to an excellent year in terms of domestic consumption. Production in most provinces increased, with the notable exception of Ontario and Quebec, which were the hardest hit by the imposition of American duties. The Canadian government is challenging the American decision before the trade tribunals of the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA).

2002	Million cubic metres	Annual change (%)	
		1 year	10 years
Production	73.0	4.4	2.1
Exports	51.3	2.2	1.6
Consumption	23.6	10.5	3.1

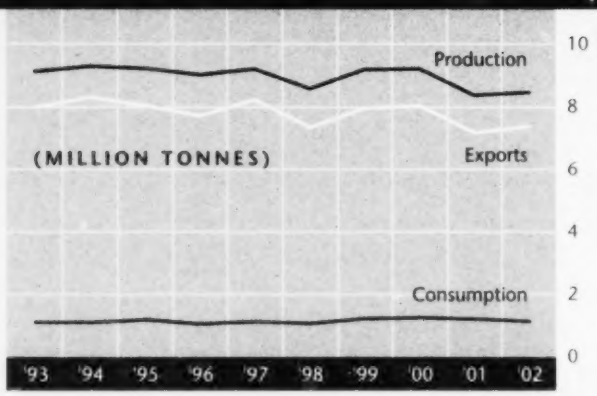
WOOD PULP



In 2002, Canadian wood pulp production increased by almost 600 thousand tonnes over the previous year, an increase of 2.4%, to 25 505 thousand tonnes. Canada is the leading global exporter of pulp. Exports in 2002 increased by nearly 500 thousand tonnes to 11 805 thousand tonnes, an increase of 0.6%. The remaining pulp produced and the small amount imported—13 966 thousand tonnes in 2002—are transformed into paper and paperboard. Pulp consumption only increased by 87 thousand tonnes over last year. By way of comparison, the increase in the use of waste recycled paper was 146 thousand tonnes. World prices for pulp remained low in 2002, such that the value of exports decreased despite an increase in their volume.

2002	Million tonnes	Annual change (%)	
		1 year	10 years
Production	25.5	2.4	1.1
Exports	11.8	4.5	2.3
Consumption	14.0	0.6	0.1

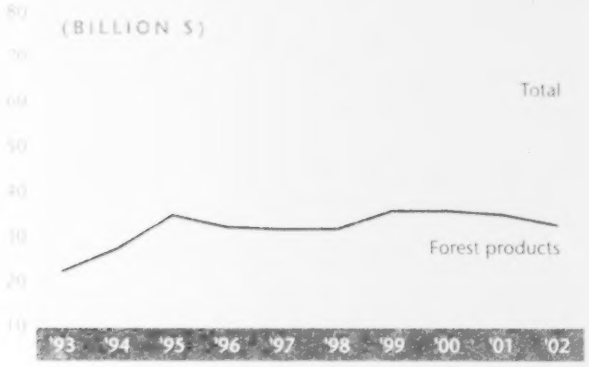
NEWSPRINT



Canada is the world's foremost producer and exporter of newsprint, exporting 87% of its production to more than 70 countries in 2002. Canadian exports rose to nearly 7 393 thousand tonnes, an increase of 200 thousand tonnes over 2001. Domestic consumption, on the other hand, decreased by about 80 thousand tonnes to 1 153 thousand tonnes. Production increased a slight 88 thousand tonnes to 8 465 thousand tonnes. The growth in global consumption of newsprint has been slowing for several years now, and Canadian producers are more and more turning toward other types of paper. Over the last ten years, Canadian production has decreased by 0.8% per year.

2002	Million tonnes	Annual change (%)	
		1 year	10 years
Production	8.5	1.1	-0.8
Exports	7.4	2.9	-0.8
Consumption	1.2	-6.3	0.2

TRADE BALANCE



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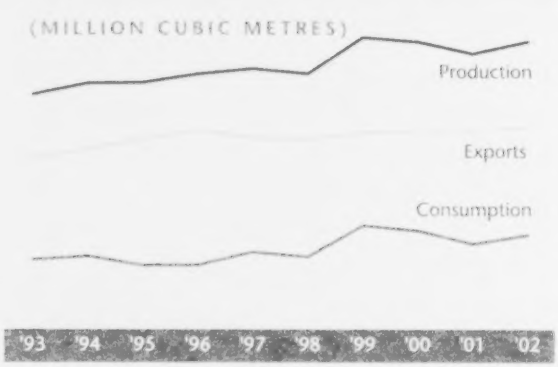

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Consumption	23.6	10.5	3.1

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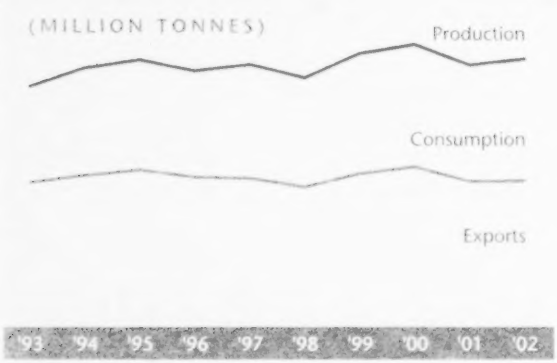

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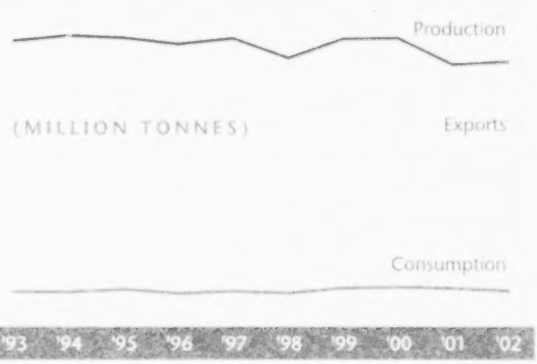

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FEATURE
Article

A Glimpse into the FUTURE of CANADA'S FORESTS and Forest Sector

The future of Canada's forests is being shaped by a variety of rapidly evolving economic, environmental and social values that Canadians deem important. Some of the issues currently preoccupying Canadians include: the long-term timber supply and the competitiveness of the forest sector; the impacts of climate change on Canada's forests; the integration of non-timber forest values; the conservation and protection of forest ecosystems; the impacts of harvesting practices on wildlife habitat; biodiversity; and forest landscapes. Canadians also expect governments to provide sound forest policy and timely and comprehensive information for balanced decision making and to demonstrate conclusively that Canada practices sustainable forest management.

In the recent past, Canadian governments have responded to growing public interest and concerns with greater regulatory control, largely aimed at improving forest practices and expanding parks and protected areas. Governments and industry are also increasing the degree of public participation in forest planning and management, widening Canada's forest knowledge base, developing forest information systems and placing more emphasis on non-timber forest benefits. At the same time, Aboriginal peoples, woodlot owners, local communities and forest workers all seek a more prominent role in decision-making processes.

Public concern and competitiveness are powerful forces that will shape the future of Canada's forests, which today contribute three percent of the country's GDP and provide direct and indirect employment for an estimated one million people. Existing policy and institutional and commercial frameworks need to evolve so that the forest sector of tomorrow can continue its historical record of success.

The future of the forest sector rests on a multi-faceted, coordinated approach by all levels of government and stakeholders that includes, among others, the integration of Aboriginal and local community forest values; increasing attention to non-timber products and uses; new technologies and management practices; new and innovative partnerships; certification programs; life-cycle analysis approaches; plantation forests; and efforts to improve Canadian performance in international markets.

*"We should all be concerned
rest of our lives there."*

(Charles F. Kettering)

This article looks to the FUTURE in an effort to determine how the forest sector might change in the years ahead. It is possible, for example, to envision a dynamic future that features:

- **PUBLIC PARTICIPATION** that takes place in the planning stages of forest management, and is enlightened by accurate, comprehensive and balanced information, thereby allowing conflicts to be resolved at the development stage of management plans;
- Greater national and international interest in **NON-TIMBER USES AND PRODUCTS**, particularly in areas such as medicine and nutrition;
- Forest policies that have been developed using the best **SCIENCE**, that integrate forest management and planning, and that involve a spectrum of specified **USES AND VALUES**, both timber and non-timber;
- A more **FLEXIBLE** forest industry that is able to take advantage of the rapid changes in an increasingly competitive marketplace;
- A holistic, legally binding international **FOREST AGREEMENT** for all types of forest;
- **INDIGENOUS KNOWLEDGE**, values, principles and perspectives incorporated into national and international actions on sustainable forest management;
- Greater forest management capacity developed through strengthened **EDUCATIONAL OPPORTUNITIES** nationwide, with particular attention to Aboriginal and local communities involved in resource management;
- Greater reliance on **PRIVATE WOODLOTS** to provide forest products and a greater commitment to sustainable forest management; and
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COMMUNITIES OF INTEREST

Diverse groups with different perspectives and objectives are working together on a made-in-Canada solution to the challenges facing our forest sector.

One certainty about the future of forestry in Canada is that Canadians—rural and city dwellers, Aboriginal peoples, forest industry workers and conservationists—will demand and receive an ever greater say in how these vital resources are managed. More than 90 percent of Canada's forests are public property (71 percent provincial; 23 percent federal) giving governments ultimate responsibility for most forestlands. In practice, the management of federal land that is located north of the sixtieth parallel has been devolved to the territories, and the planning and management of timber resources in most jurisdictions is largely delegated to forest companies operating under licence or agreement.

Public dissatisfaction with this arrangement has grown steadily over the past 20 years. In response to widespread concern about certain forestry activities, clearcutting for example, most provinces and territories now provide opportunities for members of the public to be involved in planning how forests are managed. This ensures that all interested parties know the issues and are familiar with the positions of other parties to the negotiations. More importantly, it means that future conflicts will be resolved at the planning stage, putting an end to the "war in the woods" confrontations of the past.

Clearly, the "public" does not speak with one voice. On the one hand, there are those who live in or near the forests, have forest-related jobs, trap, hunt, fish or pick mushrooms and berries in the forest, or use the forest for other recreational pursuits. Then there are urban dwellers, the majority of Canada's population, concerned about the future of the forests but often not well informed about the economic and social impact of forestry activities or about issues such as the consequences of natural events and human activities. Canadians need access to accurate, comprehensive and balanced information if they are to have a meaningful role in planning the future of our forests.

Public participation has come a long way in the past couple of decades thanks to major national consensus-based instruments like the National Forest Strategy and the Canada Forest Accord. But many forest stakeholders still see a need for increased public participation. What's more, they want this input to be a real influence on outcomes, not just an obstacle to be overcome before industry and government go about their business.

ABORIGINAL AND LOCAL COMMUNITIES

Perhaps the best illustration of the growing trend toward dialogue and partnership at all levels is the role now being played by Canada's Aboriginal and local communities in shaping the forest agenda. About 80 percent of Canada's Aboriginal peoples live in forest communities, and their rights, values and traditions are integral to forest decision making.

COMMUNITIES OF INTEREST

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Aboriginal land claims and treaty rights will have a major impact on Canada's forests in the years ahead, particularly where claimants are granted exclusive control of the land. The use of these forests could change; they could even be removed from the commercial inventory, with as yet unknown implications for planning, forest use, tenure agreements and the commercial wood supply.

Although the idea of incorporating Aboriginal perspectives in decision making only gained international recognition at the 1992 Earth Summit in Rio de Janeiro, the concept of managing forests for cultural, spiritual and economic values and opportunities was already embedded in Canada's National Forest Strategy. The tradition and values of Aboriginal peoples are expected to continue to form an integral part of Canada's forest strategies in the future.

Governments at the provincial level are working to create forest management opportunities for First Nations. Ontario's Northern Boreal Initiative offers First Nations communities a leading role in developing and managing vast new areas of northern Ontario currently being opened up to forestry. In 1999, the Saskatchewan government announced plans to double the forestry industry, providing benefits for northern and Aboriginal communities. In the spring of 2000, the Government of Canada, the Government of British Columbia and the Nisga'a Nation gave legal effect to the first modern-day treaty in the province. The treaty sets out the Nisga'a right to self-government and establishes the authority to manage their own lands and resources. And in 2002, the Government of Quebec signed an agreement giving the Cree Nation a larger role in the development of forest resources.

Meanwhile, the relationship between the forest industry and First Nations communities has been undergoing a transformation. The industry is committing to employment and training targets and awarding contracts to First Nations businesses. It is also helping new businesses find their feet by providing mentoring and financial assistance, lending equipment, helping in the development of bids and entering into joint ventures and agreements.

FIRST NATIONS FORESTRY PROGRAM

Since 1996, the federal government's First Nations Forestry Program has supported First Nation communities in learning how to manage forest resources. To date, some 370 communities have received assistance to develop and implement forest management plans and 5 700 First Nation workers have improved their skills in forestry-related activities and business development and expansion. Typical projects include: developing and implementing forest management plans; conducting forest inventories and silviculture projects; training and skills development in areas such as forest protection and fire suppression; and developing business plans and feasibility studies in areas such as forest harvesting and value-added products.

Joint ventures and partnerships between large forest companies and government-sponsored projects are steadily increasing in number, size and scope. As First Nations and Inuit land bases expand, governance responsibilities increase and more young people enter the labour market, there will be a greater need to identify business opportunities and develop forest management capacity as well as professional and technical skills. This will mean expanding educational opportunities and supporting Aboriginal and local communities involved in resource management.

Although to date the involvement of Aboriginal peoples and communities in forest management has been largely in the conventional area of timber management, that too is changing as indigenous knowledge and values help to broaden our forest knowledge base. One example of traditional knowledge in action is the White Feather Initiative of the Pikangikum First Nation (see text box). Successes like White Feather, supported by increasing numbers of Aboriginal professional and technical resource managers, will increase pressure for new policies promoting similar First Nations management projects on public lands.

On the international front, the federal government has encouraged Aboriginal participation in multilateral forest negotiations, including the United Nations Forum on Forests, the Convention on Biological Diversity and the Earth Summit. At the 2002 World Summit on Sustainable Development held in South

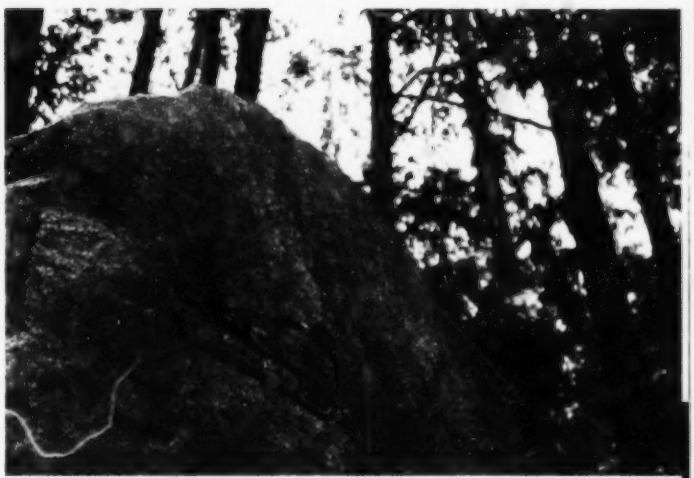
WHITE FEATHER FOREST INITIATIVE

In 1997, the Pikangikum First Nation created the White Feather Forest Initiative, a community-driven development plan covering approximately 1.3 million hectares. The Initiative gives the community responsibility for forest management planning, developing forestry opportunities, creating non-timber forest products businesses and promoting tourism in protected areas.

Over the past three years, Pikangikum and the Ontario Ministry of Natural Resources have established a co-operative Strategic Action Planning process that complements the Community-Based Land-Use Planning process.

In addition to land-use planning, the White Feather initiative involves feasibility assessments, collection of biophysical and indigenous knowledge data, and building infrastructure, capacity and communications. There are also cooperative community-led research relationships with non-Aboriginal scientists, research institutions, the environmental community and the forest industry. The initiative emphasizes new and ancestral livelihood opportunities, particularly for young people.

Africa, Canada presented 21 different case studies by Canadian Aboriginal authors. The participation of Aboriginal peoples in international forest dialogue will increase as the world's forest nations incorporate indigenous values, principles and perspectives into their forest management and planning processes.



EXAMPLES OF ABORIGINAL FOREST-BASED BUSINESSES:

- Tanizul Timber Limited, owned by the Tl'azt'en First Nation, manages a Tree Farm License in British Columbia;
- In Saskatchewan, Norsask Forest Products, owned by the Meadow Lake Tribal Council, is the largest First Nation-owned forest products company. It is also a joint venture partner in Mistik Management, which holds a Forest Management Licence Agreement;
- In Quebec the Waswanipi Cree First Nation owns a timber harvesting and road construction company and has a majority ownership in Nabakatuk Corporation, a joint venture with Domtar. In 1997 the Waswanipi Model Forest became the only Aboriginal-led forest in the Canadian Model Forest Program.

PRIVATE WOODLOT OWNERS

Privately owned forests, which comprise about six percent of Canada's forestland, are another important component of the national forest mosaic. There are two main types: industrial forests, large and often owned by forest companies; and non-industrial forests (or woodlots), smaller and mainly owned by private individuals, often farmers. There are about 425 000 private forests in this country, most of them in eastern Canada.

Woodlots are an important source of raw material for the forest industry, and the income from pulpwood, sawlogs and other forest products helps ensure economic stability for many rural communities.

In addition to economic benefits, private forests make important ecological and aesthetic contributions to the rural landscape. In the deciduous forest region, for example, private forests provide a home for many unique plant and animal species. In some places, woodlots are all that is left of the original forest ecosystem. Private woodlots also provide a range of other non-timber products and uses, including maple syrup, recreational opportunities and watershed protection.

In the future, private forests may need to fill the gap as more public lands are set aside for conservation or other purposes. Clearly, if private forests are to continue providing ecological, social and economic benefits, significant changes are needed:

- A commitment by woodlot owners and their organizations to practice sustainable forest management;
- Government recognition of the timber and non-timber benefits that woodlots provide to Canadians; and
- Public outreach by governments and woodlot organizations to give Canada's mainly urban population more information about the benefits woodlots provide to society as a whole.

STAKEHOLDERS WITH NON-TIMBER FOREST INTERESTS

A forest is more than just trees; it is also animals, birds, other plants, fungi, streams, clean air and scenery. Recreation, hunting, fishing, berries, mushrooms, maple syrup, medicines, craft products, spices, flavourings, perfumes, Christmas trees, wood waste products and biofuels are just some of the forest's many benefits, not to mention such vital ecological benefits as clean water, wildlife habitat and biodiversity. Non-timber uses, products and benefits are increasingly important in forest management and will have a significant influence on future forest policy.

Canada recently revised its national Criteria and Indicators (C&I) Framework of Sustainable Forest Management, which includes a number of impor-

tant non-timber forest product indicators. Indicators for evaluating non-timber forest products include:

- The contribution of non-timber forest products and forest-based services to the gross domestic product;
- The value of unmarketed non-timber forest products and forest-based services; and
- The annual harvest of non-timber forest products relative to the levels of harvests deemed to be sustainable.

Although there is currently little reliable information about the economic value of such products and their social benefits to forest communities, many stakeholders agree that interest in non-timber uses and products—particularly in areas such as medicine and nutrition—will grow substantially.

Currently, most forest policies that deal with non-timber products and uses do so separately from timber. What is needed is an integrated forest management and planning approach for the whole spectrum of uses and values, and the research required to achieve this end.

Some non-timber products can be gathered without interfering with timber management, and therefore agreement on timing and access may be all that is necessary. But where products occur in certain stages or benefit from specific practices (for instance, the use of fire to produce black morels or site preparation for blueberries), these objectives should be introduced during the forest management planning stage.

In the future, Canada's forests will have to be managed holistically, taking into account timber and non-timber values. This might involve transferring responsibility for managing certain forests from mill or conversion facilities to broad-based organizations that oversee both timber and non-timber resources. Other forest users and stakeholders could participate directly in these organizations as shareholders or partners, or through some form of agreement or contract. A spectrum of arrangements may be needed to reflect regional and provincial differences.

Another option would be to give forest management companies incentives to invest in both timber and non-timber resources. Such companies would engage in a partnership with affected communities and organizations.

INTERCROPPING: MARRYING FORESTS AND AGRICULTURE

Intercropping—growing trees with agricultural crops—is an age-old practice, common in developing countries but virtually unknown in Canada. Studies in Ontario show that an intercropping system using hybrid poplar instead of a single agricultural crop can mean an eight-fold increase in the rate of carbon sequestration. Given Canada's commitments under the Kyoto Protocol, it is essential that scientists from a wide range of disciplines continue to research this subject. Agricultural lands are easily accessible and there is a large area of degraded land (up to 57 million hectares) that could be used in afforestation and agroforestry. This provides an important opportunity for collaboration between agricultural and forestry services to expand intercropping in regions such as southern Ontario and the lower mainland of British Columbia.

In some areas of Quebec, timber management is being integrated with blueberry production. In 2000 blueberry producers in the province indicated that their industry's development depended on the use of public forestlands currently under timber supply and forest management agreements. Guidelines were developed to harmonize the activities of forest managers and blueberry producers, with bands of forest alternating with strips of blueberry production. Intensified tree planting on the forestry component is aimed at increasing, if not replacing, production lost to blueberries. It is expected that by 2007 about 5 000 hectares of forestland will be available for blueberry production in combined arrangements. This type of development requires new leasing arrangements and allocation protocols, as well as further research on the most effective ways to integrate management.

FOREST INDUSTRY

Canada's forest industry is grappling with a variety of factors that are affecting its ability to remain competitive on world markets. These include the emergence of new producers of low-cost fibre, green consumerism, the integration of non-timber values in forest management, major international industry mergers, capital taxes and administrative costs, government regulations and a shrinking commercial forest.

Canada's share of the world market for pulp and paper has declined since 1990, due in part to growing competition from Scandinavia and countries in the Southern Hemisphere. The ability of forest companies to continue competing internationally depends on the ongoing availability of wood supply and on the industry's capacity to create the products and services in demand.

Over the last decade, available commercial forestland has diminished as more areas have been set aside for protection and settling Aboriginal land claims. Harvesting limits have been reached in some regions.

There is a growing need to find ways of increasing the volume of wood produced from a given area. Some companies are exploring new ways of reducing rotation time and experimenting with fast-growing species. Governments are also looking into how to balance conservation with sustainable use.

With the exception of the prairies, high mountains and the tundra, trees are the natural dominant vegetative cover in Canada. However, marginal farmlands represent the only areas available for expanding forest cover. Reforestation on such lands may take place naturally or through planting.

Forest management practices in certain areas may become more focused on providing wood. Forests where native species of softwoods and hardwoods grow in monolithic stands could be managed intensively and primarily for timber production, with due regard for watershed and other ecological considerations. Such management will require investments in regenerating and tending, and could be encouraged through market incentives for public lands.

REGULATORY AND ADMINISTRATIVE CONTROLS

Canada's forest industry has remained competitive by cutting costs and enhancing productivity through advanced technology. But modernizing requires a great deal of capital investment, and the industry is finding it difficult to keep pace with the capital taxes and other administrative, monitoring and compliance costs it faces. Many of its manufacturing facilities are indeed state-of-the-art, and others have been upgraded, but there are still many requiring significant capital investment.

Capital taxes are being phased out at the federal level, and the provinces of British Columbia and

Quebec recently announced capital tax reductions. Alberta has eliminated all of its capital taxes. While these are positive steps, more is needed. Current taxation and administrative and regulatory policies, such as those dealing with prescriptive fibre access, energy and transportation, hinder the sector's development. The federal government's Smart Regulation initiative to reduce regulatory duplication and inefficiency should help forestry companies reduce costs and attract the investment needed to remain competitive.

VOLUNTARY MARKET INSTRUMENTS

Certification is a voluntary market-based system used by industry to demonstrate that timber and non-timber forest products come from sustainably managed forests. As home improvement retailers, homebuilders, and major companies move to ensure that the products they buy come from sustainably managed forests, many forest companies are responding with environmental management systems.

Canadian companies have made great strides in certifying their operations, and the process is expected to continue. The success of certification will depend on the consumer's ability to sort out what each system means, and the degree to which these systems are recognized by governments, buyer groups and other certification systems.

Another emerging approach to assessing sustainability is the life-cycle assessment (LCA) method used by the construction industry to select environmentally acceptable products. LCA is an internationally accepted method for quantifying the total environmental effects associated with products; from extraction of resources to product manufacture and transportation, to product installation, use and maintenance, to disposal or reuse.

As an example, this cradle-to-cradle assessment tool was developed to assist architects and builders in making choices on environmental impacts. A typical LCA analysis would quantify the impact of design across a set of measures including energy and raw material use, global warming potential, photochemical smog formation potential, acidification and ozone depletion potential and solid waste production.

Recent studies here and abroad have shown that wood used in housing construction competes favourably with light-frame steel or insulated concrete forms in five of six environmental measures. These results reflect the fact that wood is a comparatively clean and efficient manufacturing process. Canada can further optimize its wood waste management through increased waste recovery activities (reduce, reuse and recycle).

INTERNATIONAL COOPERATION

The trend towards improved forest management will be increasingly influenced by international pressures.

One way to look at the impact of international agreements is to ask how they have changed the way we think of forests and forest issues. There is broad consensus that over the past 50 years, and particularly since the 1992 Rio Earth Summit, the trend towards sustainable forest management has been strongly influenced by international guidance, whether arising from voluntary partnerships or international treaties.

In Canada, all levels of government pursue the goal of sustainable forest management. They recognize the connections that exist among the economic, environmental, social and cultural aspects of forest use and conservation. Enshrining sustainable forest management in legislation and policies can, in part, be linked to the guidance arising from the international forest policy dialogue.

Canada has shared its knowledge and expertise in sustainable forest management with the international community through the Montréal Process Working Group on Criteria and Indicators (C&I) for the Conservation and Sustainable Management of Temperate and Boreal Forests. Based in Santiago, Chile since its creation in 1995, this group has 12 member countries representing 90 percent of the world's temperate and boreal forests. In addition to improving the capacity of countries to report on the sustainability of their forest practices, the working group is promoting greater world recognition of the use and value of the Criteria and Indicators Framework of Sustainable Forest Management. (See also special article on page 64.)

Another form of partnership is reflected in bilateral agreements with other countries. Canada has science and technology agreements affecting forestry with the European Union, France, Germany and Japan. It has also a very active country-to-country arrangement through a memorandum of agreement signed in 1998 between Natural Resources Canada and the State Forestry Administration of China. This agreement covers broad areas of cooperation, including sustainable forest management, forest protection, forestry equipment and trade in forest products.

Despite these and other voluntary efforts, numerous international agreements, goodwill declarations, and much hard work in recent years, forests worldwide continue to disappear at an alarming rate—according to the United Nations, an estimated 113 000 km^2 annually, an area twice the size of Nova Scotia.

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Inappropriate forest policies, programs and activities exacerbate food insecurity, poverty, civil conflict and environmental degradation. Current forest policy in some regions of the world fails to reflect the critical contribution forests make to both the global environment and economy.

There are a host of international agreements that deal directly or indirectly with forest management. Canada is party to agreements that deal with biodiversity, climate change, desertification, persistent organic pollutants and trade in endangered species, among others.

The contribution of such international treaties and conventions on forest management at the national level is currently under debate. Some see the agreements as a foundation for concerted international action on specific problems. Critics, however, feel that such agreements fail to sufficiently oblige nations to make the changes needed to arrest degradation, deforestation and other such serious problems.

Many of the international agreements on forests that are in place today were formulated more than 10 years ago, when the concept of sustainable forest management was still embryonic. They do not address key issues such as the definition of sustainable forests, methodologies to measure and demonstrate sustainability, and the frameworks that provide the specific elements required to ensure to customers that the forests and products are sustainably managed. As well, they do not address the latest trends in corporate social responsibility and socially responsible investments.

Another question is whether the continuation of international guidance will be sufficient to mobilize the required financial resources and the transfer of environmentally sound technology, particularly in developing countries, to achieve sustainable forest management goals. A holistic, legally binding forest agreement for all types of forest would provide a common understanding of what it means to implement sustainable forest management and would facilitate that implementation.

Since 1995, Canada has promoted the idea of an International Forest Convention (IFC) to comprehensively address forest issues and values while balancing social, economic and environmental interests. Such an agreement would level the playing field for forest countries by establishing a shared definition of sustainable forest management applicable to all nations. A legally binding convention would also help to build the political commitment required to achieve the UN Millennium Development Goals, notably the elimination of poverty. Canada's challenge in the immediate future is to advance the international forest agenda by increasing dialogue, sharing information, developing bilateral arrangements, and encouraging a more participatory and consultative approach by many non-government organizations in the international forest dialogue process.

SCIENCE, TECHNOLOGY AND INNOVATION

MAINTAINING CANADA'S COMPETITIVE EDGE

Forest research is becoming more complex, multidisciplinary, and international. Fostering cooperation and partnerships among forest researchers in government, universities, research institutes and other organizations is vital as the forest sector copes with such new challenges as carbon management, extracting value from the full production chain, invasive species, and certification in a global market.

CLIMATE CHANGE

One area of great complexity is climate change. Global warming and commitment to the Kyoto Protocol will continue to shape Canada's forest sector well into the future. Scientists predict that climate change will have pronounced effects on Canada's forests, both favourable and unfavourable. The net impacts of climate change on the forest sector and forest-dependent communities in Canada would be a function of a wide range of biophysical and socio-economic effects. Since this report includes several special articles related to the subject, it will not be revisited here.

A new value is being added to the forest as a result of the 1997 Kyoto Protocol. Because forests store carbon from the atmosphere, they are valuable as a carbon sink. In addition, an exciting investment opportunity is being created in the forest sector as carbon credits emerge as a new and valuable product. The trading of carbon credits could make forests an important component of the international carbon market in the future.

BIOTECHNOLOGY AND GENETICS

The primary objective of research in biotechnology and genetics is to provide tools to practise intensive forestry and to provide environmental-friendly products. Biotechnology research by the Canadian Forest Service of Natural Resources Canada is focused in three areas: producing superior trees, developing biological pest control methods to replace chemical pesticides and herbicides, and assessing the environmental impacts of products developed through biotechnology. Extensive research is underway on trees with the best growth and other qualities, as well as the identification of genes that may enable trees to resist certain diseases or pests.

Researchers with Paprican and the University of British Columbia are studying genes that control fibre formation and wood chemistry in selected hybrid poplars. The expected results include assessment tools for predicting wood and fibre quality from tiny amounts of DNA, even in seedlings. Scientists will eventually be able to introduce mechanisms to reduce the risk of poor wood quality, thereby helping ensure financial success for forest plantations.

INVASIVE ALIEN SPECIES

Growing global trade in forest products has created concerns about the introduction of exotic pests and diseases into Canada's forests. The Emerald ash borer, the Brown spruce longhorn beetle, the Gypsy moth, the Butternut canker and the European larch canker are examples that are already present in this country.

Any species occurring in an area to which it is not native may be classified as an alien species. When they cause changes in ecosystems, displacing native organisms by competing for space and nutrition, altering habitat, or are predatory, alien species are considered invasive.

Invasive species are increasingly recognized internationally as an issue with wide implications for biodiversity, ecosystem and human health, natural resource industries and international trade. Besides not having natural checks to their survival and spread, they reproduce quickly, disperse widely at the first opportunity, tolerate a fairly broad range of conditions, and resist eradication once they are established. The boreal forests are considered particularly susceptible. Over 300 species of tree-feeding insects from Europe have successfully invaded North America.

Addressing alien forest pests involves detection, identification and monitoring; assessment of their impacts; predicting their establishment and spread; and designing mitigating and preventive measures. Canada is working to improve its understanding of these pests, including their natural enemies. For example, researchers are collaborating with their Chinese counterparts on testing detective systems, including DNA-based identification of certain pests.

INCREASING FOREST SUSTAINABILITY THROUGH ALTERNATIVE FOREST MANAGEMENT STRATEGIES

Canada's ability to compete in world markets is being severely tested. Some customers are becoming self-sufficient while competitors with forest plantation products are entering Canada's traditional markets. The United Nations Food and Agriculture Organization predicts that plantations will supply close to 50 percent of all wood supply by 2040—up from 20 percent today—surpassing primary forests as the world's main source.

Current average yield in Canadian forests is about 1.7 cubic metres per hectare per year. Due to the country's cold winters and short summers, only a few tree species have been studied for fast-growth and high-volume yield. The most commonly mentioned species is hybrid poplar, others include Norway spruce, Siberian and Japanese larch and White spruce.

Current average hybrid poplar growth varies from nine to 25 cubic metres per hectare per year, depending on the site and the species. Factors such as soil quality, climate, insects, diseases and the intensity of management result in widely varied yields. On better sites, tree growth is reported to be as high as 35 cubic metres per hectare per year.

Establishing fast growing tree plantations in Canada would offer an alternative wood supply source, contribute to an economy driven by innovative technology and research, encourage investment, and create new opportunities for rural landowners.

INCREASING FOREST GROWTH THROUGH SILVICULTURE

There are four basic harvesting and regeneration systems: clearcut, shelterwood, seed tree, and selection. The first three are used primarily for species that grow naturally in even-aged stands. The last is used where more than one age class is managed in a stand. The majority of Canada's commercial conifer species are managed as even-aged stands. The selection system is often used for species that are very shade-tolerant, such as sugar maple. There are no hard and fast rules for when to apply these systems, and more than one may be used in any given forest. Decisions on which system to use are based on knowledge of forest conditions and management objectives.

Experience from other countries shows that major gains in forest productivity can result from incremental or intensive silviculture combined with improvements to tree species. Practices, such as improved forest harvesting, site preparation, seed selection and control of stand density have resulted in a three-fold increase in productivity. When these practices are combined with tree improvement, better control of competing vegetation and pests, and nutrition, the result is a five-fold increase. Extensive incorporation of similar intensive management techniques in Canada could result in notable forest productivity gains.

VALUE-ADDED FOREST TECHNOLOGY RESEARCH AND DEVELOPMENT

Canada has three national forest research institutes that provide world-class technological and forest management solutions for increasing both the competitiveness and the environmental sustainability of Canada's forest sector. In collaboration with the federal and provincial governments, universities and forest partners, these institutes develop value-added forest products and provide cost-effective technology to make forest industry operations more efficient and environmentally sensitive.

Forintek Canada Corp. is Canada's national wood products research institute. It supports the forest products industry in moving up the wood product value chain to facilitate market diversification.

Forintek offers technological solutions in lumber manufacturing, building construction systems, wood drying and protection, and in developing building codes and standards both nationally and internationally. Some research initiatives currently underway include: a wood surface modification project aimed at improving the resistance of wood to weather; the development of wood hardening technologies; a review of automation processes for the Canadian prefab homes industry; and improvements in the fastening capacity of panel products.

Much of the work of the Forest Engineering and Research Institute of Canada (FERIC) is in minimizing environmental impacts in areas such as harvesting, transportation and roads, and silviculture operations.

FERIC is developing high technology systems for use in heavy equipment tracking and navigation, applied robotics, and laser-based scaling and wood chip classification. A recently introduced innovation, the Opti-Grade system, is a vehicle-installed computer device that can identify and warn forest managers of specific areas of unpaved roads in need of grading. It helps to avoid potential vehicle damage and reduces the costs associated with road maintenance.

Paprican conducts pulp and paper research aimed at improving the industry's competitiveness through process improvement. Its research is focused on ensuring a continuing supply of low-cost quality fibre, engineering development, and improving equipment and product performance, waste management, chemical and mechanical pulping, and papermaking.

For example, Paprican is pilot testing an inhibitor that prevents high-yield pulp from yellowing during light exposure. This technology will increase the use of high-yield pulp in value-added paper grades.

TECHNOLOGY PARTNERSHIPS

One significant issue facing Canada's forest sector today is how best to maximize and mobilize forest resources—both human and financial—regardless of jurisdiction and authority, so that forest research and technology development can be conducted in a coordinated, efficient and effective manner. Canada has recently seen the creation of some research partnerships that may well become models for future endeavours.

Pulp and Paper Innovative Education and Research

In January 2003, the Pulp and Paper Research Institute of Canada joined forces with several universities to establish the Pulp and Paper Innovative Education and Research (PAPIER) network. This new network is expected to coordinate pulp and paper research and enhance postgraduate education and training across Canada. It will strengthen support for researchers and students, facilitate linkages between distant researchers, and foster Canada's technological competitiveness.

Sustainable Forest Management Network

Established in 1995 and hosted at the University of Alberta, the Sustainable Forest Management Network involves 29 Canadian universities and conducts research in eight critical areas of forest management. The initiative is supported by the federal government's Network of Centres of Excellence fund, five provinces, four First Nations, 11 forest companies and a non-governmental organization.

One of the fundamental advantages of the Network is its interdisciplinary approach to research. It develops networks of researchers and partners to address known and emerging challenges to forest sustainability and to offer innovative approaches to knowledge transfer. Scientific results are used to inform policy makers, revise or renew land management strategies, and create a better public understanding of scientific issues concerning Canada's forests.

A national partnership approach

Even with various networks in place, there is still a widely held view that the national forest science and technology community is too fragmented to maximize its contribution to the sector and to Canadians' quality of life. The issues confronting the forest sector have become increasingly complex, cutting across jurisdictional and public/private interests. Addressing them requires the capacity to mobilize collective and distributed national forest S&T assets—human, financial and technological. As well, no single organization is positioned to take advantage of strategic investments in forest S&T across the production value chain from point of research to market.

Towards this end, an innovation council has been proposed to meet the need for a new high-level management structure to help mobilize forest-related science and technology and provide the Canadian forest sector with strategic research guidance. A national working group has been struck to develop the concept, with representatives from industry, academia, the federal and provincial governments and researchers.

FORESTRY EDUCATION

Adapting today's training programs to tomorrow's needs.

Professional foresters, scientists, technologists and technicians who study and manage the forests are essential to the future of Canada's forest sector. As the sector itself changes, the education and training of those who watch over it must keep pace.

Canada is home to eight university schools of forestry and 23 colleges with technician or technology programs in forestry and natural resources. Courses and programs have been adapting to new developments, needs and technology. There is growing emphasis on computer-based geographic information systems and geographic positioning systems and a shift towards content on forest ecology and landscape management.

Sustainable forest management is developing into a complex science that involves biology, soils, hydrology, economics and social sciences. Increasingly, practitioners are required to work closely with experts in all of these areas, and that trend will no doubt continue. Some university and colleges are already reflecting the diverse needs of future forestry practitioners through new curriculum designs.

Canada's forestry schools are currently contemplating the creation of a "Virtual Forestry University". This would be a major step towards attracting first-class students from Canada and abroad. The concept was first proposed by the Association of University Forestry Schools of Canada in 2002. The goal is a collaborative institution that uses a wide range of technologies, including distance learning and interactive research seminars. It could attract students from abroad and provide a window on Canadian forestry expertise and research.

A lack of accurate information and/or exposure to misinformation at both primary and secondary school levels is generally believed to be one reason why few high school graduates are interested in forestry. Some forestry schools have implemented recruitment programs to address this, while others are providing schools with career information. A number of associations and organizations also disseminate information about forests, forestry and careers. A committee of the Canadian Institute of Forestry was struck recently to review options for improving coordination and consistency of these efforts.

Another trend seen in Canadian universities and colleges is the attempt to attract more Aboriginal students to natural resource programs, including forestry, through the introduction of Aboriginal content into the curricula. Three colleges have designed forestry programs specifically for Aboriginal students.

CONCLUSION

Forests are integral to the Canadian landscape, economy and psyche. More and more Canadians are demanding a meaningful role in decisions affecting the future of forests, the vast majority of which are publicly owned. Governments and industry have responded by creating more effective public participation processes, and providing opportunities for dialogue at all levels.

Aboriginal peoples are reclaiming their right to not only participate in forest-related decisions, but to plan, manage and benefit from forest resources. The concept of managing forests for indigenous forest values is embedded in the National Forest Strategy. The federal government, provinces, territories and the forest industry are all working with Aboriginal peoples and local communities to ensure that they have the opportunities, training, resources, land and authority to resume their traditional interdependence with the forests.

With six percent of Canada's forestlands in private hands, efforts are underway at all levels to ensure that their owners are committed to sustainable forest management, and have the incentives and the information they need to implement it.

Forests offer many goods and benefits in addition to timber, some of which may even compete or be inconsistent with timber harvesting. In future, more integrated management and planning is required so that forest resources are treated holistically, as sustainable assets.

The forest industry is the single largest contributor to Canada's balance of trade. To retain its enviable position, efforts must be made to ensure continued access to forest resources, and a greater degree of competitiveness. On the competitiveness side, governments are working to reduce capital taxes and unnecessary regulatory burdens, enabling companies to make necessary technological advances and attract investment. Experimentation with fast-growing species, conversion/ reconversion of marginal farmland, and intensive management are some of the ways that the access issue can be addressed.

Partnerships at all levels are the norm in forestry. This is partly because of the multi-faceted nature of forests, and partly because sustainable management requires a great deal of accurate and reliable information. Internationally, Canada is spearheading efforts to create a legally binding International Forest Convention to halt the disappearance of the world's forests and facilitate implementation of sustainable forest management.

Canadian scientists are world leaders in areas such as biotechnology and silviculture research. Given the complexity of today's issues, however, there is a clear need to create an innovation council to mobilize, coordinate and direct forestry science and technology efforts. A working group was recently established to develop this concept further.

Numerous universities and colleges in Canada train professional foresters and technicians. These institutions are constantly upgrading their curricula to reflect changes in the industry, and the growing complexity and multidisciplinary nature of the issues involved. They are also working to attract more Aboriginal students, in part by adding more Aboriginal content to courses. Discussions are underway to create a "virtual forestry university", a way of ensuring that forest knowledge and education keep pace with the times.

While existing frameworks have adapt now. Some must become ***transparent****—there is no single however, one concept that emerges for better* ***dialogue, participation*** *and we will sustain them for* ***future***

served the forests and Canadians well in the past, many must more ***flexible****, others* ***legally binding****, others more* ***open and*** *solution to the issues and challenges of the future. There is in every discussion of sustainable forestry, and that is the need* ***cooperation.*** *The forests belong to all Canadians, and together,* ***generations.***

SPECIAL
Articles

Mountain Forest Ecosystems: Conserving and Sustaining BIOLOGICAL DIVERSITY

Throughout the world, more and more attention is being given to the conservation and sustainability of biological diversity in mountain ecosystems. Mountains are unique, incorporating the biological diversity of forests, inland waters, agricultural lands, as well as dry and sub-humid lands.

Canada's mountain ecosystems are located within the Boreal and Montane Cordillera Ecozones. These ecosystems provide a wide range of timber and non-timber forest products to local communities. They also supply fresh water to communities and ecosystems through extensive river systems that may run several thousand kilometres from their source, which is melting snow pack. Mountain ecosystems provide unique recreational and cultural opportunities for Canadians, as well as for people from around the world who consider mountains an integral part of the Canadian experience. Mountains can also be of spiritual significance to many people, particularly members of the First Nations.

The mountain forest ecozones account for 10 percent of the Canadian land mass and are found in British Columbia (66%), the Yukon (29%) and Alberta (5%). They contain mostly commercially productive forests (72%). Although mountain forest ecozones only constitute about 15 percent of Canadian forests by area, they provide important habitat for a wide range of plants, animals and smaller organisms.

Canada's mountain forest ecosystems are unique because of the magnitude of the area they cover, the high amount of rainfall they receive from moist air masses moving eastward from the Pacific Ocean, and their productivity. Indeed, they contain some of the only temperate mountain rainforests in the world. Others are found in parts of South America, Australia and New Zealand.

Experts have identified five broad elements that affect mountain biodiversity:

1. Mountain vulnerability to human and natural disturbances, and the low rates of ecosystem recovery following these disturbances;
2. The relatively high susceptibility to climate change compared with lowland areas;
3. The high degree of ecological and human connectivity with lowland areas, particularly with regard to water resources;
4. The high levels of crop genetic diversity and the great potential for diversification of agricultural varieties; and
5. The exceptional levels of human cultural diversity.

Tree harvesting and other disturbances caused by humans can fragment or alter ecosystems, leading to loss of suitable habitat for endangered species or those in decline, such as mountain caribou and the Vancouver Island marmot. They can also cause loss of connectivity between different ecosystems, both vertically and horizontally. This can have serious impacts, particularly on animals that forage at different altitudes at different times of the year.

One of the specific challenges for maintaining biodiversity is that harvesting is taking place at increasingly higher elevations as commercial wood availability and market patterns change, and as operational difficulties

are overcome. The sustainable use of these forests requires successful regeneration and recognition of realistic rotation lengths.

In terms of recreation, increased human access and resultant impacts can negatively affect the very environments that draw people in the first place. On the other hand, expanding protected areas to ensure the integrity of mountain forest ecosystems and their biodiversity can negatively affect local economies. A balance must be struck between these important values.

Mountain forest biodiversity and climate are closely linked. In fact, altitude serves to greatly compress the effects of climatically induced ecosystem differences compared with the distances required to bring about ecosystem change in lowland ecosystems. This leads to high biodiversity within a small area, as plants and animals of increasing specialization occupy more challenging niches with increasing altitude. Mountain forests are thus part of the continuum between valley ecosystems and non-forested alpine tundra, contributing to ecosystem connectivity between greatly contrasting parts of the landscape.

Climate change that causes ecosystem boundaries to shift up or down can result in highly specialized plant species that are adapted to extreme ecological conditions not being able to disperse fast enough to become established in new locations. This in turn affects interconnected plant and animal species. Climate change may also affect the frequency and severity of disturbances such as fire, as well as the range and impact of diseases and pests. For example, the spread of non-native pine blister rust has been exacerbated because fire protection policies have reduced natural control through burning. As a result, the disease is now a major cause of mortality in whitebark pine, whose seeds are an important food source for high-elevation wildlife.

Mountain forestry is clearly fraught with challenges. How well mountain forest biodiversity is maintained will be one indicator of Canada's success in meeting those challenges. Canada was one of the first developed countries to ratify the United Nations Convention on Biological Diversity (CBD). The overall purpose of the CBD is to significantly reduce the loss of biological diversity at global, national and regional levels. A Programme of Work on Forest Biological Diversity has been adopted, and one to address mountain biological diversity is under development.

The CBD Programme of Work on Mountain Biological Diversity will seek to build on and complement the work being carried out under the CBD Expanded Programme of Work on Forests, while recognizing the unique attributes of, and operating conditions in, mountain forests.

Research on mountain forests has unfortunately been hindered to date by a comparative lack of general knowledge about these ecosystems. New programs must recognize that as altitude increases, growth rates slow, and therefore more time is required for ecological and biological research. Efforts also have to be made to ensure that the visual impacts of forest activities are minimized, because harvesting patterns are visible for longer distances in the mountains than in lowland areas. As stated earlier, increased knowledge about climate change impacts is also needed because of the potential effects over short distances along altitudinal gradients.

Species at Risk Act: Protecting our WILDLIFE

Canada has recognized and embraced the importance of maintaining biodiversity and long-term productivity and stability of the ecosystem. Indeed, this country has a long-standing commitment to protecting and preserving species at risk. The signing of the United Nations Convention on Biological Diversity (CBD) in 1992 was the impetus for developing the Canadian Biodiversity Strategy, which called for the development of legislation and regulatory provisions on the protection of threatened species and populations.

SEASIDE CENTIPEDE
Endangered

The protection of wildlife is a shared responsibility in Canada. The *Accord for the Protection of Species at Risk*, agreed to in 1996, commits the federal, provincial and territorial governments to establishing complementary legislation and programs to protect Canada's species at risk.

The *Species at Risk Act* (SARA), which came into force June 5, 2003, was proclaimed in two stages. In the first stage, SARA's general provisions of obligations such as species recovery, the list of species, emergency orders and environmental assessment of listed species came into force. SARA's prohibitions and enforcement provisions respecting the killing of individual species and protection of critical habitat among others are scheduled to come into force on June 1, 2004. This two-step approach to proclamation provides Canadians with a transitional timeframe to implement SARA.

As Canada's first-ever federal species at risk law, SARA builds on provincial governments' wildlife protection laws and on commitments Canada made as a signatory to the CBD and the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The Act aims to protect species at risk from becoming extinct or lost from the wild, with the ultimate objective of helping rebuild their numbers. It complements existing federal laws such as the *Fisheries Act*, the *Migratory Birds Convention Act 1994*, the *Canada National Parks Act*, the *Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act*, and the *Canada Wildlife Act*, as well as provincial and territorial legislation and programs.

SARA also recognizes the essential role in the conservation of wildlife of Canada's Aboriginal peoples and the wildlife management boards established under land claims agreements. The most significant development is the Act's requirement to establish a six-person National Aboriginal Council on Species at Risk, which will advise the Minister of the Environment on administration of the Act. This Aboriginal Council will also provide advice and recommendations to the Canadian Endangered Species Conservation Council, which is composed of federal, provincial and territorial representatives.

ACADIAN FLYCATCHER
Endangered

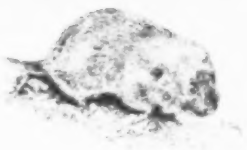
WHITE WOOD ASTER
Threatened

Under the Act, the scientists who assess and classify the status of wildlife species—the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)—will be given legal status as they continue to operate at arm's length from the government. COSEWIC assesses and classifies the status of wildlife species using the best available scientific, community and Aboriginal traditional knowledge. These assessments will be published and will form the basis for the Minister's recommendations to the Governor in Council for additions to the list of wildlife species at risk. In order for the Act's protection measures to have legal force, an endangered species must be included on the list of wildlife species at risk, as set out in Schedule 1. Wilful destruction of "Schedule 1 species" is a criminal act subject to penalties under the law.

WOOD TURTLE
Special concern

A number of binding provisions take effect once a particular species is added to the list of wildlife species at risk. For example, the Act contains prohibitions against the killing or harming of individual members of a listed species and destruction of their dwelling places (dens, nests, etc.). These general prohibitions in SARA provide for a uniform level of protection for Schedule 1 species, and apply automatically to migratory birds protected by the *Migratory Birds Convention Act 1994*, aquatic species protected under the *Fisheries Act*, and all species on federal lands. In fact, most birds and aquatic species currently listed under SARA are already managed under other federal legislation such as those mentioned above. The provinces and territories are given the first opportunity to protect other listed species through their legislation. If they do not, the Act provides discretionary authority to apply the prohibitions wherever these species are found.

Under SARA, stewardship is the first response to critical habitat protection. It is an essential component of the cooperative process that brings together landowners, conservationists, governments and other partners to protect species and habitat. The proclamation of SARA and its associated list of wildlife species at risk may lead to increased collaboration on the part of the government and the forest sector to develop the science and database needed to monitor forest-dwelling species and their critical habitat. The forest sector may have to consider expanding implementation of its landscape and adaptive forest management approach as more is learned about the critical habitat and range of affected populations. The sector could also be called upon to play an even more prominent role in the development of recovery strategies and action plans for forest-dwelling species listed under SARA.



WOODLAND VOLE
Special concern

The listing process acknowledges that adding species to the list of wildlife species at risk could potentially have serious economic and social implications for Canadians. The *Species at Risk Act* includes provisions for compensation should it become necessary to prohibit the destruction of critical habitat. In the meantime, the Government of Canada will develop the regulations required under the Act, including regulations on compensation.

Climate CHANGE:

Canada's Forest Response

In the coming years, climate change is expected to have a significant impact on Canada's forests and on the social and economic structures that depend upon them. Because of their role in the carbon cycle, forests themselves can have a direct impact on climate change. The 1997 Kyoto Protocol, as well as increasing scientific evidence of a changing climate, focused the world's attention on these two facts, and placed Canada in the position of having to understand the role and response of its forests in relation to climate change and to meet stringent international reporting requirements. This forms the backdrop for Canada's forest-related climate change research, and underpins efforts to develop and implement technologies and strategies to enable Canadian forests and communities to better adapt to the present and future impacts of a changing climate.

IMPACT ON FORESTS

Increasing temperatures caused by climate change could move the treeline significantly northward over the course of this century. Because forests respond slowly to change, they may become mismatched with their altered environment. Changes in climate could also increase the frequency and severity of natural events such as storms and wind, drought, and severe fire and insect disturbances. These changes are expected to be less predictable than in the past and to vary regionally, with profound impacts on the health and distribution of forests, as well as on the forest industry and forest-dependent communities.

There is a great deal of scientific research being conducted to better understand how climate change will affect Canada's forests and how to adapt to potential changes. The Integrated Biosphere Simulator (IBIS) is a model that projects future responses of Canada's forest vegetation (such as changes in distribution and productivity) to scenarios of climate change. To date, only one scenario has been investigated, but a newly funded project will allow the model to explore several different scenarios and to investigate the large-scale impacts of some possible adaptation strategies to serve as a guide at both the regional and national scale.

The Government of Canada has developed the Canadian Climate Impacts and Adaptation Research Network (C-CIARN)-Forest Sector as part of a national network that facilitates the generation of climate change knowledge, identifies information gaps, and defines research priorities in areas affecting forest users and forest-dependent communities. Over the long term, C-CIARN-Forest is expected to advocate for an increased level of research directed at climate change impacts and adaptation in the forest sector, to enhance collaboration between researchers and forest users, and to find and implement adaptive responses to climate change consistent with the twin objectives of sustainable forests and sustainable forest-dependent communities in Canada.

FORESTS AS CARBON SINKS

Forests can act as both a sink and a source of carbon dioxide, which is known to be a contributing factor to climate change. The forest is a sink when it grows and absorbs carbon dioxide from the atmosphere, and when it uses carbon to produce plant tissue. When the forest is harvested, burned, destroyed by insects, or converted to other land uses such as agriculture, housing, or roads, some of the carbon is returned to the atmosphere as carbon dioxide—the forest becomes a source. It is the net effect of these activities and natural disturbances that will determine whether the forest is a sink or a source over time.

The Climate Change Plan for Canada—the Government of Canada's framework for action on climate change—estimates that our forests could provide an annual sink of 20 megatonnes of carbon dioxide from 2008 to 2012. Investments in plantations, policy changes to reduce deforestation, and changes in forest management practices, including intensive silviculture and increased forest conservation, could significantly enhance the size of this sink. On the other hand, severe fire and insect disturbances could reduce the sink.

There are a number of initiatives underway as part of the Government of Canada Action Plan 2000 on Climate Change, including the Shelterbelt Enhancement Program to encourage more planting of trees around farms so they can sequester carbon dioxide and reduce wind erosion of soil; and the Feasibility Assessment of Afforestation for Carbon Sequestration (FAACS), which is analysing the potential for the large-scale creation of new forests.

In addition, the Forest 2020 initiative could contribute to Canada's climate change target and further sustainable forest management through the establishment of plantations of fast-growing high-yield tree species on non-treed land, intensified silviculture in previously harvested, second growth forest areas, and increased conservation of natural forests. The establishment of plantations of fast-growing tree species across Canada would provide the country with increased flexibility in achieving its climate change targets during the first commitment period by producing Canadian-made credits. These plantations could contribute even more with time since the plantations would continue to sequester carbon beyond 2012.

MONITORING AND MEASURING

Work is currently underway to develop and implement a system for monitoring and measuring forest carbon. The Carbon Budget Model combines data from forest inventories with information—obtained through partnerships with provinces, territories and industry—on forest ecosystem dynamics, natural disturbances, management actions and land-use change. The model accounts for all ecosystem carbon pools and is compliant with international accounting rules being developed by the Intergovernmental Panel on Climate Change.

The ECOLEAP (Extended Collaboration for Linking Ecophysiology and Forest Productivity) project is measuring and modelling the growth processes of trees (photosynthesis, transpiration, etc.) and of the other terrestrial components of the carbon cycle in relation to climate and forest types. The work includes the development of a procedure by which site-specific information can be scaled up to the landscape level, and includes a strong remote sensing component. The work is also aiming to develop process-based tools suitable for forest management applications.

Creating new forests and reducing the permanent loss of existing ones could increase and enhance the storage of carbon in Canada's forest ecosystems, thereby reducing concentrations of carbon dioxide in the atmosphere. Scientific work is ongoing to ensure that the tools are in place to measure and monitor forest carbon changes over time, and to ensure that our forests and forest sector will be able to adapt to a changing climate.

MOUNTAIN PINE BEETLE Initiative:

Combatting the Infestation

The province of British Columbia is currently facing the largest pine beetle infestation in its history, with over 1.46 million hectares of infested trees. Weather conditions, fire suppression and an abundance of mature lodgepole pine have combined to create the optimum conditions for this highly devastating pest.

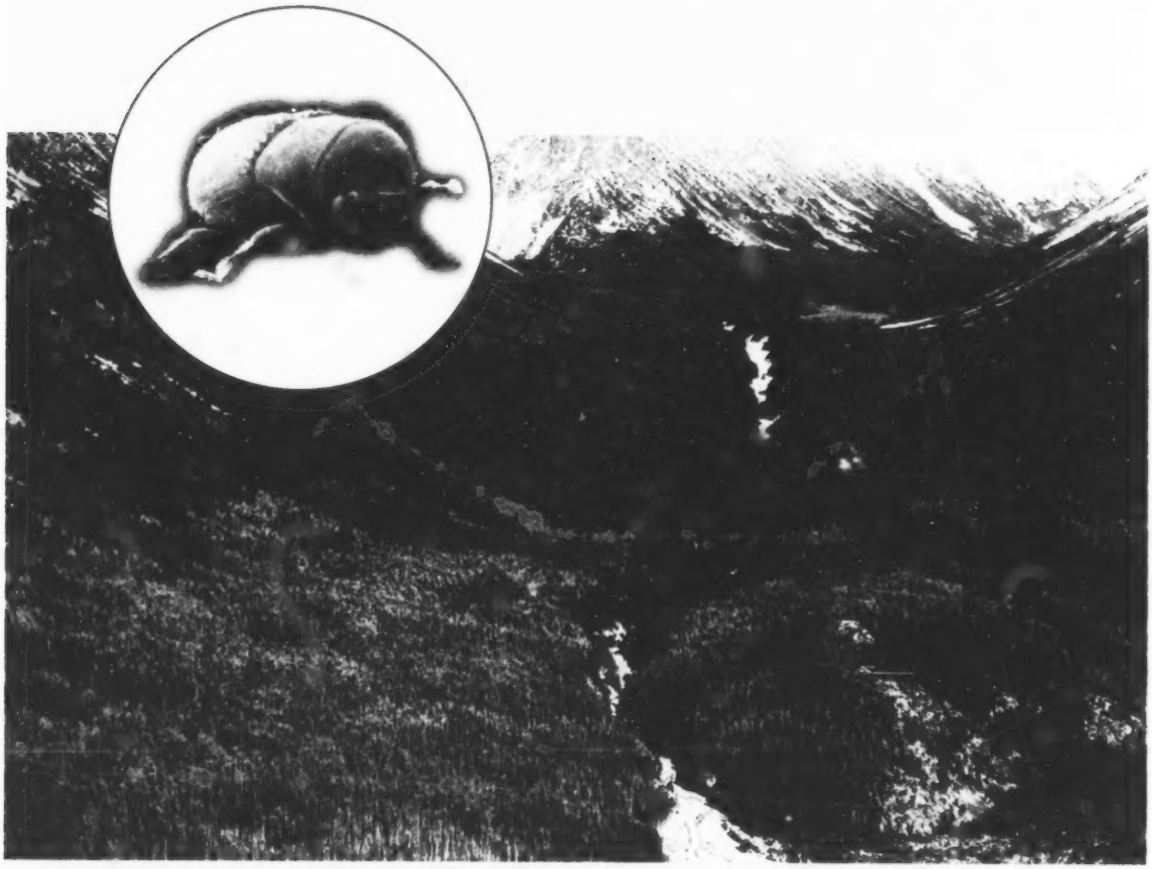
Native to western North America, this tiny black insect burrows into lodgepole pines and transmits blue stain fungi that can destroy the connective tissues within a tree. In addition, the blue stain left on the tree after the beetle's attack lowers the grade of the lumber, reducing its market value. Low market prices for lumber in general and the ongoing softwood lumber negotiations with the United States further aggravate the situation for the industry.

Lodgepole pine accounts for more than half of the growing stock in the interior of British Columbia, and is the predominate species of commercially harvested timber. Provincial government agencies and the forest industry have been working hard to address the threat posed by the pine beetle, and are adapting their strategies in response to growing infestations. The British Columbia Ministry of Forests has been cooperating with industry to streamline administration, address timber-pricing issues, make more volume available for harvesting infested trees, and allocate resources and funds to facilitate effective control. Unfortunately, this has not been enough to contain the epidemic.

In October 2002, the federal government announced a $246-million softwood lumber aid package that includes a five-year, $40-million investment to assist British Columbia in its ongoing efforts to address the epidemic and minimize its economic impact. The investment partners federal government departments, the Government of British Columbia, national research institutes, First Nations, and industry in initiatives aimed at improving control efforts, reducing the risk of future epidemics, rehabilitating federal and private lands, and sharing information on how to respond to beetle outbreaks on non-commercial lands.

The land-based and research programs are currently being developed. Natural Resources Canada is partnering with researchers at the University of British Columbia, provincial agencies and national forest institutes (Forintek Canada Corp., the Forest Engineering Research Institute of Canada, and the Pulp and Paper Research Institute of Canada) to share knowledge and benefit from each other's expertise and experience. This cooperation is expected to lead to solutions to the current mountain pine beetle attack and to reduce the risk of future infestations.

This "Mountain Pine Beetle Initiative" will target improved research on beetle outbreaks and the rehabilitation of federal and private forestlands impacted by the beetle infestation. In the short term, research will focus on the immediate requirements for rehabilitating federal and private (non-industrial) forestlands ravaged by the mountain pine beetle, and how to obtain the most value from affected forests. Looking ahead, research will address the need to quantify the economic and ecological impacts of beetle infestations and to reduce the risk of future mountain pine beetle epidemics.



The land rehabilitation component of the initiative involves federal and private forestlands. In terms of federal lands, the program will focus on containment of the infestation in national parks; on control, rehabilitation and forest management capacity in First Nations reserves; and on forest rehabilitation on military lands. For private forestlands, the program will assist private, non-industrial landowners who will be encouraged to participate in early identification and intervention, as well as the clean-up of those forest stands already infected. Applications for assistance under this component are currently being assessed.

Communities impacted by beetle infestations can also benefit from the activities of the British Columbia Forest Service, as well as other federal programs such as the Community Adjustments Fund ($110 million), the Canada Wood Export Program ($30 million), the Value-added Research Initiative for Wood Products ($15 million), and the Canada Infrastructure Works Program.

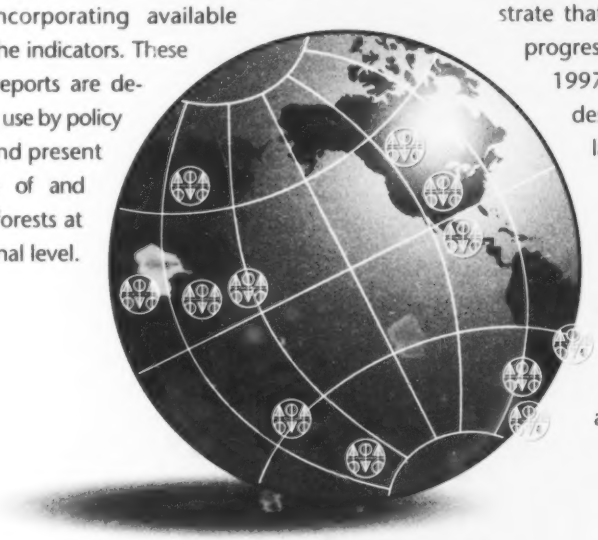
For more information on the mountain pine beetle epidemic and research please visit http://mpb.cfs.nrcan.gc.ca/index_e.html

The MONTRÉAL PROCESS Reports on CRITERIA AND INDICATORS

The Montréal Process is the Working Group that developed and continues to implement internationally agreed upon criteria and indicators (C&I) for the conservation and sustainable management of temperate and boreal forests. It is a science-based tool that guides the monitoring, assessment and reporting of progress made in sustainable forest management in 12 temperate and boreal forest countries.

The Montréal Process is one of nine regional and international C&I processes. Its 12 member countries—Argentina, Australia, Canada, Chile, China, Japan, Korea, Mexico, New Zealand, Russian Federation, the United States of America and Uruguay—together account for 90 percent of all temperate and boreal forests, 60 percent of all forests, and 45 percent of all trade in forest products.

To report on progress to date, each participant country recently produced its first national forest report incorporating available data on the indicators. These country reports are designed for use by policy makers and present the state of and trends in forests at the national level.



In addition, an overview report—to be released at the XII World Forestry Congress—will present the results of the first national forest reports to the international community, policy makers, forest practitioners, and other interested parties. This overview reports on one indicator under each of the seven Montréal Process criteria. These criteria are very similar to those of the Canadian Council of Forest Ministers' framework and other international processes. They are: (1) biological diversity, (2) productive capacity of forest ecosystems, (3) forest health and vitality, (4) soil and water resources, (5) forest contribution to the global carbon cycle, (6) socio-economic benefits and (7) legal, institutional and economic framework. The report will also outline the next steps for the Montréal Process.

The country reports and the overview report demonstrate that all Montréal Process countries have made progress in reporting forest information since their 1997 *First Approximation Reports*. Interestingly, despite vast differences in forest ecosystems, land ownership patterns, economic development and government structure, many of the member countries show similar trends over the past few decades. These include decreased conversion of forests to agriculture or urban land, increased regulation or other measures to protect soil and water, and small decreases in forest employment as a percentage of overall employment.

While the capacity to collect and report on indicators varies greatly among countries, no country is yet able to report on all 67 indicators, primarily because:

- certain data have not traditionally been collected (e.g., non-wood forest products),
- scientific agreement has not been reached on how certain data should be collected, thereby creating data gaps at sub-national levels (e.g., soil and water conservation), or
- little or no scientific understanding exists on how to measure an indicator (e.g., forest fragmentation).

Participant countries have realized a number of benefits through their collaboration in the Montréal Process. One of the most important is the exchange of information and experience, which enables them to identify common goals for implementing criteria and indicators, consolidate technical know-how related to indicator measurement and data collection, foster bilateral and regional cooperation among members, and enhance national capacity to report on sustainable forest management. Participation in this international C&I process has catalyzed national efforts and promoted a shared view about what constitutes sustainable forest management and how to measure it.

In a sense, one era of the Montréal Process is coming to a close and another is about to begin. With the completion of the national forest reports and the overview report, Montréal Process members have demonstrated that they can assess their countries' forests using this particular C&I framework and have a better understanding of the challenges that remain.

Considerable improvement in the ability of countries to report on the state of forests using the Montréal Process criteria and indicators is expected over the next five years.

It is also anticipated that C&I will be increasingly used as a framework for strategic planning, expanding forest inventories, involving stakeholders in sustainable forest management, and communicating progress to policy makers at the national and sub-national levels. It is conceivable that criteria and indicators in sustainable forest management may also provide a useful model for monitoring, assessing and reporting on other natural resource conditions, such as rangelands, mining and freshwater.

Looking to the future, all 12 member countries will be seeking ways to increase their capacity to report and to better inform policy makers. In these exciting times, the Montréal Process member countries are looking forward to working closely with other C&I groups to increase global recognition of the contribution of criteria and indicators to sustainable forest management and to enhance international cooperation on sustainable management of forests and other land contexts.

Canada's New NATIONAL FOREST STRATEGY

On May 1, 2003 the National Forest Strategy Coalition presented a bold vision for Canada's forest at the ninth National Forest Congress in Ottawa. Canada's fifth *National Forest Strategy (2003-2008), A Sustainable Forest: The Canadian Commitment*, provides direction for policy development, research initiatives and activities to improve forestry practices.

The new Strategy is a consensus document that will guide Canadians in sustainable forest management and assist the forest community in making the necessary adjustments to better meet the challenges ahead. It will also serve to promote enhanced activity to ensure sustainable management of all forests across the country.

Canada's Prime Minister, the Right Honourable Jean Chrétien, stated in his message to Congress participants that the new Strategy "... is good news for all Canadians .... It is essential that all parties ... continue to work together to ensure the sustainable management of our forests."

The Honourable Herb Dhaliwal, Minister of Natural Resources Canada, updated the Congress on the state of Canada's forests. "Because we depend on our forest to such a large extent, we must develop ways to ensure that we continue to share its benefits for generations to come. That's what our National Forest Strategy does.... It is up to all of us to maintain our leadership role," he indicated.

The Strategy developed by the National Forest Strategy Coalition, which is composed of government, industry, Aboriginal, private woodlot and other non-governmental interests, defines realistic targets and activities that will make consequential improvements over the next five years. The key priorities and overall direction for the stewardship and sustainable management of Canada's forest were determined through extensive cross-country consultations and public dialogue with the forest community, as well as recommendations put forth by the independent final evaluation of the *National Forest Strategy 1998-2003*.

Specifically, the fifth Strategy contains a series of eight strategic themes with 47 associated action items.

In addition to the unveiling of the *National Forest Strategy 2003-2008*, the National Forest Congress was also the stage for the signing of the third *Canada Forest Accord*. Signatories pledged their cooperation, assistance and energy toward the goal of a sustainable forest nationwide, and agreed to encourage others to do the same. Over one million Canadian jobs and more than half of Canada's trade surplus are related to Canada's forest. Its stewardship is everyone's concern.

National Forest Strategy (2003-2008)

A SUSTAINABLE FOREST:

The Canadian Commitment

V I S I O N :

"The long-term health of Canada's forest will be maintained and enhanced, for the benefit of all living things, and for the social, cultural, environmental and economic well-being of all Canadians now and in the future."

To realize the vision, Canadians will apply their knowledge, expertise and resources, and be guided by the spirit and intent of the Strategy's eight strategic themes:

1. **ECOSYSTEM-BASED MANAGEMENT**

   Manage Canada's natural forest using an ecosystem-based approach.

2. **SUSTAINABLE FOREST COMMUNITIES**

   Develop legislation and policies to improve the sustainability of forest-based communities.

3. **RIGHTS AND PARTICIPATION OF ABORIGINAL PEOPLES**

   Accommodate Aboriginal and treaty rights in the sustainable use of the forest recognizing the historical and legal position of Aboriginal peoples and their fundamental connection to ecosystems.

4. **FOREST PRODUCTS BENEFITS**

   Stimulate the diversification of markets, forest products and services and benefits (both timber and non-timber).

5. **KNOWLEDGE AND INNOVATION FOR COMPETITIVENESS AND SUSTAINABILITY**

   Maintain and enhance the skills and knowledge of forest practitioners and mobilize the broader Canadian knowledge community to establish a new forest innovation agenda for Canada.

6. **URBAN FOREST AND PUBLIC ENGAGEMENT IN SUSTAINABILITY**

   Actively engage Canadians in sustaining the diversity of benefits underlying the importance of Canada's forest, including the urban forest.

7. **PRIVATE WOODLOTS' CONTRIBUTION TO SUSTAINABILITY**

   Increase the economic, social and environmental contribution by Canadian woodlot owners to Canadian society through a concerted effort to strengthen policies and services.

8. **REPORTING AND ACCOUNTABILITY**

   Create a comprehensive national forest reporting system for all valued features of the forest, both urban and rural.

National Forest Strategy (2003-2008)

The Canadian Commitment

V I S I O N :

"The long-term health of Canada's forest will be maintained and enhanced, for the benefit of all living things, and for the social, cultural, environmental and economic well-being of all Canadians now and in the future."

To realize the vision, Canadians will apply their knowledge, expertise and resources, and be guided by the spirit and intent of the Strategy's eight strategic themes:

1. **ECOSYSTEM-BASED MANAGEMENT**

   Manage Canada's natural forest using an ecosystem-based approach.

2. **SUSTAINABLE FOREST COMMUNITIES**

   Develop legislation and policies to improve the sustainability of forest-based communities.

3. **RIGHTS AND PARTICIPATION OF ABORIGINAL PEOPLES**

   Accommodate Aboriginal and treaty rights in the sustainable use of the forest recognizing the historical and legal position of Aboriginal peoples and their fundamental connection to ecosystems.

4. **FOREST PRODUCTS BENEFITS**

   Stimulate the diversification of markets, forest products and services and benefits (both timber and non-timber).

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   Maintain and enhance the skills and knowledge of forest practitioners and mobilize the broader Canadian knowledge community to establish a new forest innovation agenda for Canada.

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Canada WOOD EXPORT Program

(Canada Wood)

In May 2002, the Government of Canada launched the Canada Wood Export Program (Canada Wood), administered by Natural Resources Canada. This five-year, $35-million partnership with the domestic wood industry is designed to respond to the challenges confronting that sector as a result of substitute products, aggressive low-cost competitors and restrictive trade practices (such as the United States' softwood lumber tariffs and the European Union's plant health barriers).

Canada continues to rank as one of the world's preeminent manufacturers of high quality wood products. It exports to more than 100 markets, the most important over the last decade being the US, Japan and Europe. However, the challenges currently facing the Canadian wood industry point to the urgent need to diversify into new markets. Canada Wood encourages the wood products industry to maintain traditional export markets outside North America, while targeting emerging markets in China, Korea, Taiwan and India. An industry-led national export strategy developed for the Canada Wood program identified these as critical markets in which the industry should focus its efforts in the near term.

CANADA WOOD PROPOSES TO:

1. Brand Canada's wood products through an enhanced and coordinated industry presence in offshore markets;
2. Increase product knowledge and acceptance in export markets through a coordinated approach involving market development and promotional activities; and
3. Improve market access by offering technical support on issues such as building and fire codes, training and product testing against foreign standards, as well as by providing input into product standards in offshore markets.

These three elements guide project funding under the Canada Wood program, which contributes up to 50 percent of eligible project costs. In its first year of operation, the program provided $3.3 million in strategic funding to eight wood industry associations across Canada for promotional activities and technical support to address market access issues. This funding generated additional investments of $3.6 million from industry and provincial partners, for a total package of $6.9 million.

Emerging markets in China, for example, are showing positive trends even in the face of a global economic downturn. Over the last two years, exports of Canadian lumber to that country have increased roughly two-and-one-half times. Of particular note is the dramatic increase in exports of value-added products, which contribute to secondary manufacturing jobs in Canada.

India is another new offshore market in which Canada Wood is supporting the industry's expansion efforts. In fact, India has experienced a five-fold increase of Canadian lumber imports over the past two years. Exports such as fibreboard and other value-added wood products are also now being introduced and accepted by this market. Sales of these products to India were virtually non-existent before 2000.

Under Canada Wood, coordinated approaches to projecting a seamless Team Canada image are already underway. Industry associations are collaborating and have opened shared offices in Mumbia, India and Shanghai, China. Industry associations are currently busy preparing to establish other joint office venues in Japan and Europe in 2003-2004.

In addition to strategic partnering with the wood products industry, Canada Wood collaborates with provincial governments and draws on the expertise of federal departments to maximize efficiency and avoid any duplication of effort. Federal expertise in particular is involved in the delivery of Team Canada's market strategy. Government officials sit on both advisory and management committees and share their in-depth knowledge with the program secretariat. In addition, the network of Canadian trade commissioners and embassy staff abroad is able to identify local contacts, broker important commercial relationships and assist the industry through a range of government-to-government activities.

In terms of the second element of the program—the increased visibility and acceptance of Canadian products—market research, trade show participation and promotional activities are taking place in Europe, India, Japan, Taiwan, Korea and Vietnam. And technical support initiatives, such as product testing, wood-frame building code development and construction training, are being pursued under the third Canada Wood element. The adoption of wood-friendly codes and standards designed to increase the use of wood for wood-frame construction building systems and related construction techniques are being demonstrated and promoted in select Asian markets, including China, Taiwan and South Korea.

Canada Wood was initiated to diversify Canadian markets beyond North American boundaries, but it is also working with the US, our largest trading partner, to harmonize building and code standards for wood-frame construction in these Asian markets. Ultimately, the Canada Wood program will increase the recognition of Canadian wood products and create a "build with wood" culture, particularly in offshore locations that have traditionally used non-wood systems.

Points of VIEW

What is YOUR VISION of the forest sector in Canada and around the world?

Will PLANTATIONS become a significant source of timber in Canada?

INTRODUCTION

If HINDSIGHT is twenty-twenty, as the saying goes, what is FORESIGHT?

Surprisingly clear, if the visions of this year's interviewees are any indication. These members of the forest community spoke with clarity, and often conviction, about how the Canadian and world forest sectors will evolve in the decades to come, and where they see plantations fitting in Canada's future. Multiple forest demands, public participation, biodiversity, competitive global markets, intensive forest management, science and innovation, value-added production, international forest agreements—these were the most common themes to surface.

In some areas, there was virtual consensus on what matters in the future. Striking a balance among multiple demands was one of the most frequently echoed goals. Others included broadening public involvement in forest decisions, getting serious about value-added products and sharing forest expertise with developing countries.

In other areas, however, interviewees had very different, and sometimes opposing, outlooks. Some of the least agreed-upon topics? Whether Canada's forest industry should grow nationally or globally, whether an international forest convention is worthwhile, whether fast-growing plantations will influence Canadian forestry or remain on the margins. There were also varying opinions on whether the forest community, both in Canada and around the world, is close to reaching its goals. Some said that Canada in particular has made excellent headway and is on the right track for the future. Others cautioned that we still have far to go and much to do.

In keeping with this year's futuristic theme, our interviewees include not only today's forest experts, but the experts of tomorrow—forestry students across Canada.

TODAY'S FOREST REPRESENTATIVES:
Canadian and International

To gather some seasoned perspectives, The State of Canada's Forests spoke with six respected representatives from the Canadian and international forest sectors. Their views paint a vivid—though not always consistent—picture of forests in the future.

ED MACAULAY is the Executive Director of Renewable Resources at the Nova Scotia Department of Natural Resources. A research forester by profession, he has responsibility for the province's forest, wildlife and parks programs.

"When I look to Canada's future," says Ed MacAulay, "I want to see a forest sector that is well coordinated and working together, and forests that are sustainably managed to ensure multiple values as well as recognized for their importance in all areas—the economy, recreation, the environment and human health. But I'm not sure we have everything we need at this point to get there."

Coordination is a theme Mr. MacAulay inevitably returns to when discussing the future. In his view, coordination is particularly essential for forest science and technology. FORCAST, the non-profit coalition to advance forest S&T, was an excellent beginning, and he believes the new Canadian Forest Innovation Council is a natural progression. "The timing is right for this new council to take things a step beyond and provide for greater co-ordination. From the proposals I've seen, I believe it will happen. The will seems to be there."

Mr. MacAulay says research and innovation is key to a healthy forest sector. "We must have a coordinated and aggressive program of S&T and innovation to advance our science and provide our industry with the necessary competitive advantages," he says. "It's too easy to sit back and rest on what we have. This is no time for complacency. With technology evolving so rapidly, our performance will

suffer, both in the international market and in our forest management programs."

Coordination and cooperation are also the only way to manage forests for multiple benefits, not just for industrial goals. All parts of the forest sector—industry, government, environmental groups and communities—must learn to work together. "There seems to be a lot of disjunction right now," Mr. MacAulay says. "We see some really good individual efforts to improve things, but they often end up criticized by groups with opposing views." How do we get more cooperation and mutual respect? "I wish I knew," he says. "But it would help if the public had a better understanding of forestry. Current forestry practices carry a negative image for many people. Better dialogue between forest managers and the public would lead to a greater understanding of what we're doing to manage our resources, and it would be easier to develop coordinated policies and programs."

Wood supply will be an issue in the future, Mr. MacAulay says. The more we manage forests for biodiversity, wildlife, recreational use and protected areas, the more we must concentrate on smaller areas of intensively managed forest to offset fibre loss. A good way of having it all, he suggests, is to devote different forest areas to different uses. "A portion managed for multiple use, a portion left as wilderness, a portion intensively managed for industrial uses—that's a realistic vision, and one I think would be generally acceptable to different forest users."

Fast-growing plantations are critical to Mr. MacAulay's vision, and he predicts they will become a significant source of wood in Canada. "Science shows us that to get the highest productivity in the shortest time, intensively managed plantations are the way to go." Forest planting today, he says, is just replacement of the natural stand. "I envision an agri-forestry approach, with more tree selection, with trees managed for maximum growth, limited competition and best use of space."

Mr. MacAulay points out that plantations can supply the type of quality fibre for which Canada is now recognized. They can also provide raw material for a variety of newer engineered wood products. In addition, he says, plantations offer an immediate carbon sequestration benefit, especially if they are planted on abandoned or marginal farmland.

Around the world, high-yield plantations, especially those in southern climates, will be increasingly central to forestry, he comments. As the forest industry becomes more global, the balance between fibre supply from plantations in the south and natural forests in the north will shift. And as the world population climbs—and with it demand for forest products—there will be no choice but to grow more wood on fewer acres. "That's why intensive management is critical for Canada. If we don't adopt it, we risk losing our market share."

How the world views Canada's forest sector is important to Mr. MacAulay, who hopes to see more recognition of Canada's forest management. "We don't have the reputation we deserve," he says. "Whenever a foreign delegation comes to Canada, they inevitably comment on how different their view was from how our forests are actually managed. We need to ensure that the correct information is delivered. This goes back to the idea of better coordination and cooperation. We need to work together to let the world know that Canada is a progressive forest manager."

AVRIM LAZAR is the President and CEO of the Forest Products Association of Canada, the national industry association for Canadian forest product companies. FPAC's members manage 75 percent of the working forests in Canada.

Looking into the future, Mr. Lazar has high expectations for Canada's forest sector. "Canada must continue to be a world leader in sustainable practices, both on the forestry side and on the manufacturing side," he says. As well, Canada must plan to keep and enhance its position within the top three forest products countries in the world.

The only way to make this vision a reality, he believes, is to create a new partnership between governments and the forest industry. Both must agree on a shared vision and goals for the sector, both must agree on the changes they're willing to make, and both must take responsibility for their respective roles. As well, both must work with communities and others who have a stake in Canada's forests. "But," he says, "the key is for governments and the forest sector to agree on a game plan. Then each must take responsibility and act on that plan."

Mr. Lazar acknowledges that there is a degree of partnership between governments and the industry at the moment. But he envisions an entirely new approach, a new paradigm. "Government, with all the will in the world, cannot by itself make the changes we need to move this country's forest sector ahead," he says. "Nor can industry. One side cannot bring about change without the other. It's only when we

both realize that we each have responsibilities for the social, environmental and economic aspects of our forests, and when we start defining our respective roles, that we can make meaningful changes."

The type of partnership Mr. Lazar has in mind would place governments and the forest sector on an equally respectful footing. "This is very different from the current model," he notes, "in which government essentially sets policies." Last year the forest industry released a proposal for a new partnership, Forest Sector Renewal: Putting the Pieces Together (available at http://www.fpac.ca).

Turning to the global forest sector, Mr. Lazar noted that the quality of forest practices around the world is variable. Some countries' forest practices equal Canada's; some do not. In Canada, for instance, FPAC now requires that its members third-party certify all forests they manage to one of three internationally recognized standards by the end of 2006. FPAC is the only national forest industry trade association in the world to do so.

FPAC strongly advocates an international forest convention that would set standards for global forest practices. "Some countries don't have the level of forest expertise we have here in Canada," Mr. Lazar comments. "Some are not blessed with the same ecosystem knowledge we have, the same understanding of biodiversity. A forest convention would not only set standards for all countries, it would also contain an important development component to help these countries build their forest management expertise."

In the future, Canada will continue to get most of its industrial wood from well-managed natural forests, he predicts. Fast-growing plantations may supply some of our fibre, but they will be a minor source. "In Canada, we can't compete on a plantation basis with countries like Indonesia, Brazil, Australia, even the United States, which have extensive high-yield, fast-growing plantation forests. Here we have this thing called winter, and it comes every year."

In Canada plantation forests are best suited to marginal agricultural land, Mr. Lazar says, where they can add value to the land, helping with crop diversification, providing forest habitat for birds and small animals and improving water management. In such locations, he notes, forest plantations can help us get better ecosystem and economic value from the land.

Mr. Lazar adds that it will be important to look at the idea of balance between forests that see no commercial use and forests that are intensively managed with silviculture. He acknowledges that the "triad concept"—dividing forest land into some tracts that remain wild, some that are extensively managed and some that are intensively managed like crops—is an interesting idea. "But we haven't done the homework yet," he says. "Such a theory may work from a forestry perspective, but

does it work from a social perspective? What about the 350 communities across Canada that depend on the forest industry for their survival?"

Mr. Lazar worries that apportioning Canada's forests to fit a purely theoretical model may lead to "social dislocation." We must consider Canada's communities, he stresses, and how our forest decisions affect them. "It is the forest industry's vision that our sector must be a model of both social and corporate responsibility."

PEGGY SMITH, formerly with the National Aboriginal Forestry Association and still a senior advisor there, is developing a program on Aboriginal Peoples and the forest environment for Lakehead University, where she teaches. She is completing a PhD in Forestry at the University of Toronto.

When Peggy Smith looks to the future, she hopes to see "a more national forest sector, one that is managed for the benefit of Canadians." At the moment, she says, the forest's economic and social benefits are being drained out of Canada because we have structured the sector around exports and the countries that depend on them, especially the United States. "We are not using the forest resource for the greater good of Canadians," she says.

She suggests developing domestic markets for forest products rather than relying on the U.S. "We're always told that Canada is too small to sustain the market we need to keep the forest economy afloat. I think that's a crock. Look at the southern corridor of Ontario and Quebec—a significant market for US products, so why not our own?" In pursuing free trade, Ms. Smith believes, we have moved away from thinking about what's best for Canada as a nation. "We're going down a frightening path towards melding with the U.S., when we should be using our resources to build a stronger national economy."

Developing national economic policies takes political will and leadership—something we don't have now, she says. Our products don't help the situation. "We've had endless discussion about value-added products," she says, "but there's little incentive to develop a value-added industry." Historically, provincial legislation tried to stem raw wood exports by requiring some

processing in Canada, and pulp mills and sawmills sprang up across the country. "Today we're still stuck in that model of exporting semi-processed commodities," Ms. Smith says. "And now, with the softwood lumber situation south of the border, pressure is mounting for us to export logs again." We must get more value from our forest resources, she says, and keep more of that value in Canada.

Broader public involvement in forest issues is another part of Ms. Smith's vision. "I would like to see a forest sector that's truly inclusive of all Canadians who care about forests," she says. Although the public is now more involved in forest decision-making, the sector still revolves around government, industry and professional foresters. "The door has opened a crack. But besides environmental groups and some Aboriginal involvement, which are now routinely part of the process, attempts at broader public participation still cause the sector to close ranks. In the forest sector there is suspicion of the public, a feeling that 'they don't understand, they're ignorant, we're the experts.' We have to overcome that."

How do we get more public participation? A more open bureaucracy with more accessible forest information, for a start. "We must have full and informed participation," she says, "or full and informed consent, in the case of Aboriginal people." Yet Canadians still have to dig to get forest information. Speakers in Ms. Smith's classes, for instance, have had to apply to Access to Information to get forest facts from the Ontario Ministry of Natural Resources.

Once people can get forest information, Ms. Smith says, they need to see their ideas transformed into action. "People get cynical easily, and it doesn't take much for them to walk away from the table. Canadians need to see their concerns built into forest planning. Instead of planning around cutting, which is still what happens, especially here in the north, the sector should be planning around other concerns."

Turning to global forests, Ms. Smith says Canada must continue to work with the United Nations Forum on Forests to develop common ground on sustainable forests for all countries. Canada has already taken a creative and practical approach to influencing forest management with the model forests. But this influence is waning. "Since the mid-nineties, forestry at the federal level in Canada has been emascu-

lated—by funding cuts, by the dismantling of national research, and by the loss of influence over the provinces that came with eliminating transfer payments."

Ms. Smith hopes certification will improve worldwide forest management. In particular, she hopes the Forest Stewardship Council (FSC) system, to which she has contributed, widens its influence. "FSC certification has the highest standards. It's the only truly international system. And with Principle 3 on Indigenous Peoples' rights, it's the only system that fully recognizes the rights and place of Aboriginal people in the forest." Certification raises the bar for forest management without government intervention, she notes. And she hopes the bar stays high. "I am concerned about certification becoming watered down. If it's influential but loses its teeth, there's no point."

Are forest plantations in Canada's future? Ms. Smith has taken part in international talks where some have advocated reserving a portion of the world's forests—up to 40 percent—for industrial plantations, with the rest under some degree of protection. In deciding where Canada fits, Ms. Smith suggests we consider two things. The first is our boreal forest growth rate, which can never match that of more temperate regions. The second is what's best for us as a nation. "The idea of launching plantations in Canada is a reaction to external pressure," she says. "So is the idea of protecting more forest from any kind of logging. This is the sort of discussion that needs to be public and conducted from a national perspective. I return to my earlier point—we must manage Canada's forests, first and foremost, for the good of the nation, not bow to outside pressures."

DON ROBERTS is the Managing Director of Global Paper and Forest Products Equity Research with CIBC World Markets in Ottawa, Ontario. He began his career-long involvement with the forest at the age of 17, as a logger in British Columbia.

"I'm an empiricist," says Don Roberts, "so my vision starts with empirical facts." Fact number one: In Canada we consider our forest industry an economic superpower, but in international capital markets, it's a bit player. Abitibi Consolidated, Canada's largest paper and forest products company, is barely number ten in the world, valued at US$3.2 billion. Number one, International Paper, weighs in at US$20 billion. "In our own little pond, we think we're big," says Mr. Roberts, "but globally, we're nearly off the radar screen. And this is an industry where size matters."

Fact number two: The larger a company is, the lower its cost of capital; the smaller it is, the greater its disadvantage. "Pulp and paper is, bar none, the most capital-intensive of the old-economy industries," says Mr. Roberts. "Capital is critical; it's

needed not only to grow, but to sustain your existing operations." But because Canada's companies are small, they have trouble attracting the capital investment they need. The paper and forest industry as a whole is Canada's biggest net exporter, he points out, yet it accounts for just 2.1 percent of the value of the TSE (Toronto Stock Exchange) and a mere 0.5 percent of the S&P (Standard and Poor's) index in the United States. "You blink and you miss it," he says. "It just doesn't matter to most investors."

Fact number three: There is too much wood supply around the world. Housing starts in the United States are at a record high, yet the price of lumber is at a 17-year low. Industrialized countries are cutting less forest than they're growing—North America is harvesting 80 to 95 percent of its annual growth, Europe around 60 percent, Russia less than 20 percent—which means forest stock is climbing. As well, fast-growing plantations are expanding. New Zealand and Chile alone are increasing their harvest by 50 percent between 2000 and 2003. "Wood supply is rising faster than demand," says Mr. Roberts, "so prices will stay low."

What does this all mean for Canada? "Here's the first scenario," says Mr. Roberts. "The industry continues to consolidate and build its base in Canada, then uses that base to grow outside the country." Besides fewer companies, this vision means more product diversification. Mr. Roberts explains that because of Canada's competition laws, Abitibi can't buy another newsprint mill in North America. "If the company wants to grow, it has a choice: either expand outside North America or stay in Canada and venture into other production areas." And the second scenario? "The industry does nothing and contracts. It won't attract the capital it needs to grow, and it will become an even smaller player in a global market or be bought up by foreign companies."

Under either scenario there will be more mill closures, Mr. Roberts says, which will particularly affect single-industry towns. But under the first scenario, the Canadian industry as a whole will grow and diversify. "As someone who deals daily with management teams in this industry throughout North America, I can confidently say that numerous Canadian companies have the ability to thrive on the international scene. There is no need for an inferiority complex."

The Scandinavian countries, he says, which like Canada have small populations and open economies, are home to the third and fourth largest paper companies in the world. "How have they done it? They've consolidated and gone global." On the solid wood side, he notes that five years ago, in the world's ten largest lumber mills there was not one from Europe. Today four of the top five mills are European. The big loser? "Canada, specifically British Columbia, used to have all five. Now it has only one. Our sawmilling industry is still very efficient, but others are catching up."

How we handle the industry in Canada is really a public policy decision, Mr. Roberts says. "The forest products market is a global market, regardless of what we think. Once we accept that, we must re-examine policies like our competition laws, which prevent companies from growing large enough to matter globally." We must eliminate the appurtenancy clause (recently removed in British Columbia) which, by linking harvesting rights to processing facilities, removes cutting rights if a company closes a mill. "This clause breeds inefficiency," he says. "When there's oversupply, like now, a company ends up running a single shift at three mills instead of closing two and running full shifts at the third. It loses money, goes out of business, and the mills close anyway."

Fast-growing plantations may be a component of Canada's future industry, but Mr. Roberts sees them as more "on the margins." Some may spring up along the southern borders of British Columbia, Ontario and Quebec, where the climate is favourable. Mr. Roberts points out that while there may be regional shortages of wood in places like eastern Canada and China, there is no shortage of wood in the world as a whole. "We have to be careful about how much money we spend growing trees because the real price of wood fibre is declining. We might be better off investing in things like schools and infrastructure, which will better improve our competitiveness."

Mr. Roberts emphasizes that the forces affecting the forest industry—globalization, consolidation, technology—are beyond our control. What's within our control is how we respond to them. "We are talking about an economy that is dynamic, always changing. We have to change with it."

Based in Edinburgh, Scotland, **MIKE DUDLEY** is the Head of International Policy at the Forestry Commission of Great Britain, a position he has held for the past 10 years.

Looking first at the world's forests, Mike Dudley says his vision "is not a million miles away from where we are now." The forest sector around the world has embraced sustainable development to a greater extent than most other sectors, he comments, to the point where sustainability has become a core concern. "We're at the point now where economic, environmental and social stakeholders are working together. The next step involves taking some of the ideas we've embraced and putting them into practice on the ground."

That's something Canada has already begun to do, says Mr. Dudley. "Canada is in a good position because it has paid attention to the messages sent its way. As a result, it's at the forefront of demonstrating how we can translate sustainable policies into sustainable practices." The development of certification in Canada, he says, has sent clear signals that Canada is willing to work with others to put forest sustainability into practice, a willingness he expects will continue in the future.

Forest demands and needs differ around the world, Mr. Dudley points out. As a result, he thinks countries must decide for themselves how to manage their forests. "I imagine sustainable forest management as a large jigsaw puzzle," he says. "There is no picture to follow, but there are many pieces. In some places, protected areas might be a big piece; in others a small piece. Restoration, certification, prevention of illegal logging—they are all pieces, but their size may vary. Each country must decide for itself how to fit everything together to make a sustainable picture."

In the area of international forest policy, it is easy to be pulled down the path of international dialogue, Mr. Dudley says. But this should not happen at the expense of domestic discussion. Countries must listen to their domestic constituencies, not just to international bodies. "Forests by their nature are not global," he says. "And they are certainly not the same. Different forest areas around the world, and within the same country too, need to be managed differently." International concerns matter, but they should not overshadow domestic dialogue.

Yet it is just this possibility—that international pressure might strip countries of their sovereignty—that worries some in the forest community when confronted with the prospect of an international forest convention. Mr. Dudley thinks that focusing on a forest convention is like dwelling on the jigsaw box instead of its contents. "A forest convention is not necessarily wrong-headed," he says. "But we must be careful not to follow one line for dogma's sake. We must be pragmatic. Some countries are suspicious of the type of convention that may constrain them within their own borders." Over the last 10 years, he believes, the idea of a forest convention has become debilitating, always at the back of people's minds. "It has us looking at the means instead of the end. In the UK, when we look to the future, we want to move away from negotiating into actually delivering."

Turning to the question of how fast-growing plantations figure in Canada's future, Mr. Dudley stresses that plantations are just one piece of the jigsaw. "Given the importance of timber to Canada's economy, the simplistic view would be just to put in lots of plantations near the sawmills and pulp facilities. But then they're going in near highly populated areas. Is that good or bad? And what about the effect plantations may have on ecosystems?" Democratic dialogue that involves all affected parties is the only way to answer such questions, he says.

It's also important to look carefully at the economics of plantations, he says. "In the UK it's generally recognized that plantation timber is not always the best quality. Also, the economic drivers are not always there if the natural forest resource is readily available." Plantations may complement the role played by natural forests in Canada, says Mr. Dudley, "but it would be a shame to launch into anything on a big scale without first doing the homework."

On a final note, Mr. Dudley comments that years ago, forest services around the world complained of not being taken into account, of not having enough money, of having too small a voice. "We had no confidence in our contribution," he says, "and because of that, we weren't taken seriously." But today, though still financially constrained, forest services are on a different footing. They have learned to work with others and to tap into other sources of funding. "Last year at Johannesburg," he says, "the world recognized that the forest sector has something of value to contribute to sustainable development. We have developed ways of doing things—like certification, like the collaborative partnership on forests and the United Nations Forum on Forests—that other sectors can learn from. I think that's a big part of our future—sharing what we have learned."

A forest economist by training, **DAVID KAIMOWITZ** is the Director General of CIFOR, the Center for International Forestry Research, headquartered in Bogor, Indonesia. CIFOR is committed to conserving forests and improving the livelihood of people in the tropics.

Around the world, says David Kaimowitz, the forest sector will keep searching for solutions that combine high forest productivity, needed for jobs and social benefits, with environmental preservation. What these solutions are, and how they play out, will vary from region to region.

In developed countries, he says, attention has shifted from just thinking about commercial forestry production to protecting the environment and the First Nations cultures. This shift is evident in, for example, the rapid spread of certification. In developing countries, the situation is more mixed. "There are millions of people around the world who rely on the forest for medicinal plants, for energy, for income from small-scale logging, furniture making, handcrafts and so on," says Dr. Kaimowitz. "For these people, there is often no alternative to the forest—no viable agriculture, no industry. The forest sector around the world has an important role to play in making sure these people don't lose access to the forests they depend on."

People can lose their access in two ways, says Dr. Kaimowitz. First, the forest can disappear or become degraded through overlogging, forest fire and clearing. "There is as much deforestation in the tropics now as there was ten or fifteen years ago," he says. "We must take steps to reduce this loss." Second, more powerful or wealthier groups can take the forest away from people. "Here we're seeing more progress," says Dr. Kaimowitz. "More governments are making sure communities have a say in what happens to their forests. But these efforts must go farther."

Here the international community, including Canada, can help developing countries with funding, technical assistance and capacity building. The role of education is critical, says Dr. Kaimowitz. Universities in Canada and elsewhere must continue to produce experts who can share their forest knowledge with other countries.

Is an international forest convention part of the solution? Dr. Kaimowitz says the forest community does need a framework to organize itself, but it's too early to say what form that will take. "We have to remember that 40 percent of the world's tropical forest is in countries that have seen civil war sometime in the last 15 years. To expect them to immediately enforce laws and implement policies without significant external assistance is an unrealistic vision of how to make progress on the ground."

Turning to Canada's forest sector, Dr. Kaimowitz says his vision may differ from that of someone inside the country. First, he thinks Canada will serve as an interesting example to others of a federal system. "Countries like Indonesia, Brazil and Mexico are federal in theory but have grown heavily centralized over time. As they move to more truly federal systems, with more regional responsibility for forests, they will have a lot to learn from Canada as a model."

Dr. Kaimowitz also sees globalization of the forest industry as a critical trend. "With Canada so export-oriented," he says, "it's surprising the country isn't looking more seriously at market trends and other marketplaces. Here in Indonesia there is great interest in the Chinese market, now the world's number two importer but soon to become number one. When CIFOR tried to identify who in Canada is researching Chinese markets, we could only find a handful of people." If it doesn't look seriously at world trends, he says, Canada may miss out on big markets.

One undeniable trend, says Dr. Kaimowitz, is that fast-growing plantations will supply more of the world's wood. Where Canada fits in that trend, he's not sure. "I don't have enough information to say. The spread of plantations will certainly affect the natural forest, of which Canada has so much, but whether the effect will be good or bad, it's hard to say." Dr. Kaimowitz does emphasize that, with more plantations around the world supplying wood suitable for pulp and paper, it will be important for Canada to focus on developing higher-end products outside the pulp and paper market.

The future of Canada's forests mirrors that of forests everywhere, says Dr. Kaimowitz. Faced with multiple demands and users, forest sectors in all regions must decide for themselves how to arrive at balanced forest management. And making the right decisions depends on open, democratic discussion. Science can educate that discussion, he notes, but not replace it. "Some would like forest scientists and economists to assign values to forests, to say this one is more valuable for carbon, that one for biodiversity. But they're just looking for an easy way out, a way of avoiding the democratic process. At all levels—local, provincial, national and international—we must allow the democratic process to determine what happens in our forests."

TOMORROW'S FOREST REPRESENTATIVES: The Students

Who better to comment on tomorrow's forests than tomorrow's foresters? To gather some up-and-coming views, The State of Canada's Forests spoke with six undergraduate forestry students from universities across Canada. Their hopes and predictions show us how the forest looks to the next generation.

MARK STENSRUD is in his second year of the Bachelor of Science in Forest Operations program at the University of British Columbia. He also holds a technical diploma in forest engineering from British Columbia's Selkirk College.

Growing up surrounded by trees in British Columbia's Kootenay region, Mark Stensrud has always been drawn to the forest. He believes the future of Canada's forest sector depends on sustainability and jobs. "We have to manage our forests so that we always have them, and we need to keep forest jobs in Canada. We have to look at both objectives together."

Managing forests sustainably is largely a matter of trial and error, adjusting as we go, he says. "Some people say Canada is overlogging. It would be nice to cut too little rather than too much, but I don't want to see jobs lost and the national economy hurt." Besides, he points out, if we do not harvest forests they become overmature and die anyway, as in the interior of British Columbia where vast forest areas are now infested with mountain pine beetle.

Some producers are salvaging value from the infested timber, Mr. Stensrud says, selling it as a specialty "denim" wood, so called because the fungus introduced by the beetles turns it blue. Such marketing ingenuity is key to advancing Canada's forest industry. "More value-added production will increase our GDP, create jobs, boost our economy and bring governments more revenue," he says. "I don't like always seeing truckloads of raw wood going down to the States around my home town of Salmo. I saw that even more just before the US softwood tariff. If we can build finished products that the world wants, we can reduce our dependence on one or two markets."

While at Selkirk College, Mr. Stensrud learned about plantation forests, but he thinks they will have little impact in Canada. Plantation wood cannot match the quality and strength of wood from natural forests, he says. While plantations may slightly supplement the harvest, they will not alter Canada's reliance on natural forests.

CARL KRISTOFF is a combined first- and second-year student in the Faculty of Forestry at the University of British Columbia, where he is working toward a Bachelor of Science in Wood Products Processing.

For Carl Kristoff, Canada's secondary forest products industry must become much stronger in the future. "Instead of always exporting our raw material, we should be doing more processing and manufacturing here in Canada." Technology will be the basis for advancing Canada's wood processing in the future. "Technology in this field will be the way of the future," says Mr. Kristoff. Much of the machinery he sees when visiting wood manufacturers' shops and in his university labs is computerized, so there is less handling of the wood than ever.

Speaking of the world's forests, Mr. Kristoff says that Canada and the United States in particular are striving to improve their forest practices, an effort that will continue in the future. For other countries, the outlook is less certain. "Russia, for one, could be a big player in the forest industry," he comments, "but it is very unclear what's going on with that country's forests."

Mr. Kristoff adds that it will be increasingly important to set aside more forest land, especially near cities, for people to enjoy. Forest plantations are another way of addressing environmentalists' concerns. "If Canada had more plantations, there would be less expansion into natural forests." However, he says, quality is an important consideration. Plantations are worthwhile only if they do not decrease the strength and quality of the wood.

CARL BERGERON is in his final year of the Baccalauréat en aménagement et environnement forestiers program at Université Laval in Quebec. After graduating, he will start work on a Master's degree in forestry.

Carl Bergeron considers three areas important for tomorrow's forests: socio-economics, biodiversity and multiple resources. "For Canada as a whole, and certainly for Quebec, the forest sector has huge economic and social importance," he says. But preserving biodiversity and the forest's non-timber benefits is just as important.

"Canada has a great responsibility for biodiversity because it has so many forest frontiers," he says. More conservation is essential, especially in Quebec. But Mr. Bergeron is not sure the province will meets its goal of increasing protected areas to eight percent of the land within each "natural province," especially given the economic impact of protection. Nor is he convinced that eight percent is enough; 12 percent may be a better objective.

Ecosystem management—forest management based on natural processes—is another way of protecting biodiversity. "There is great research in this area, but it takes a long time to get into the forest." This is partly due to economics. The current approach is to refund forest operators only for officially recognized silviculture methods; new, unrecognized treatments don't qualify. And companies must follow strict rules for silviculture or miss out on reimbursement. "The rules should be more flexible, to encourage new methods compatible with ecosystem management."

In the world's forests, poverty is the biggest challenge. "In many countries people are so poor that they have to clear land for agriculture, itself not always sustainable. We have to address poverty first. We can't tell people to protect their forests if they don't have enough to eat."

Mr. Bergeron believes fast-growing plantations would benefit Canada. He advocates the "triad" concept—dividing forests into three parts. The first part would be protected. The second would be managed for low-impact intervention, using ecosystem management. The third would be plantations and some natural stands that would see intensive silviculture. "Plantations are a great way to help Canada achieve its forest objectives, to have enough timber for industry and still manage forests for biodiversity and multiple use."

PATRICE CARON is in his third and fourth year (combined) of the Baccalauréat en aménagement et environnement forestiers program at Quebec's Université Laval. He previously completed a three-year forest technician diploma at a CEGEP in Québec City.

After seven years of studying and thinking about forests, Patrice Caron has one vision for the sector in Canada: multi-purpose management. The forest must be managed, and an extensive area of it protected, to benefit all users, from loggers to snowmobilers to Aboriginal people. Yet that seemingly simple goal is not simple at all—nor, according to Mr. Caron, is it very near.

"We have a lot of work to do. Communities are ready now; they're asking government and companies for a bigger say in forest planning." In 2001 Quebec released a policy requiring forest companies to consult the public in forest planning, but the requirement is superficial. "Companies don't have to accept recommendations. We're still far from having different forest users actually at the table developing plans with the companies."

Mr. Caron lists says several things must change for his vision to materialize. First, logging companies must realize they are not the forest's only users. Second, they must find alternative logging methods that better use the resource. Third, the sector needs to develop new products that extract greater value from less fibre.

Looking globally, Mr. Caron says that although deforestation continues in some developing countries, "we can't blame them—we destroyed areas of our forest in earlier times." He believes industrialized nations must give more funding to developing countries to help them avoid the mistakes we have made and learned from.

As for fast-growing plantations, Mr. Caron considers them realistic and desirable for Canada. If located near processing facilities, they can keep industry from pushing into fragile northern ecosystems. They may supply a good deal of Canada's industrial wood, but not all. It is also crucial to establish ethics should genetic manipulation form part of plantation forestry. "But," he says, "that's a small price to pay to preserve the ecosystem."

SARAH MARTIN is in her second year of the five-year Bachelor of Science in Forestry program at Université de Moncton, studying at the university's Edmundston, New Brunswick, campus.

In her vision of Canada's forest sector, Sarah Martin stresses the need for balance between the economic side and the conservation side. Canada is moving in the right direction, she thinks. "But we don't have balance yet. The economic side is still predominant. It's hard when so many people depend on the forest to survive, to make a living. But we need the forest for other kinds of survival too. We need it for the environment, for natural beauty."

Scientific research is critical for tomorrow's forest sector, says Ms. Martin. She is even more convinced of this after a summer working on regeneration research projects in her campus's experimental forest. Forestry is a complex mix of sciences, she points out. Improving our understanding of how to connect and balance them is the key to better forest management.

Research is also important in deciding whether fast-growing plantation forests belong in Canada's future. "There are questions we need to ask first," she says. "For example, will we get the quality of wood we want? Plantation forestry may be worth pursuing, but we should do it slowly and carefully."

Ms. Martin is optimistic about Canada's forests. "Trying to achieve the right balance may bring us to a state of confusion, but that's a good thing. Confusion will force us to think about the lessons we've learned and how to apply them. Otherwise, we won't learn or move ahead."

JASON HALLETT is in his second year of the University of New Brunswick's five-year Bachelor of Science in Forestry program. He is minoring in wildlife.

An avid forest recreationist, Jason Hallett hopes to see other Canadians take a more active role in the forest. "If Canadians voice certain goals," he says, "industry and government have to follow. But if we sit back and do nothing, forestry just becomes an industry-government relationship." He hopes to see the media, industry and educators raise the forest sector's profile in the future.

Protecting more forests, especially near cities, is central to Mr. Hallett's vision. He calls Canada's goal of setting aside 12 percent of land "a major step forward," but would prefer a figure closer to 15 percent. He doesn't think protection rules out industrial use. Minimal-impact harvesting may have a place in protected forests, as long as the focus is on habitat and diversity.

Habitat and diversity are also key words when he contemplates plantation forests in Canada's future. "Sure, plantations are more productive and higher-yielding, but they are monocultures. They're not so much forests as tree farms." Plantations on a small scale, in selected areas, may one day form part of our landscape, but he has concerns about anything more widespread. "I've seen the effect in my own province of past forest practices that turned hardwood and mixed stands into conifer stands. That's great for the industry, but at what cost to habitat and biodiversity?"

Turning to the global forest sector, Mr. Hallett says that as demand for wood grows, limiting harvesting will become more important, as will protecting representative world ecosystems. "At the global level, it's very difficult. Different countries, different governments—they have entirely different needs for their forests. It's hard to figure out how to get them all moving towards sustainability. But I think, with a lot of experimenting, we will get there."

GLOSSARY

AFFORESTATION

The establishment of a forest or stand in an area where the preceding vegetation or land use was not forest.

BIODIVERSITY (BIOLOGICAL DIVERSITY)

The variety and variability within and between living organisms from all sources such as terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part.

BIOMASS

The dry weight of all organic material, living or dead, above or below the soil surface.

BIOSPHERE

The portion of the earth comprising the lower atmosphere, the seas, and the land surface (mantle rock) in which living organisms exist.

BOREAL FOREST

One of three main forest zones in the world (see also tropical forest, temperate forest); it is located in northern regions and is characterized by the predominance of conifers.

CARBON DIOXIDE (CO_2)

A colourless, odourless, non-combustible gas. Humans and all other living organisms give off carbon dioxide in respiration and decomposition. Trees and other plants absorb it and use it during photosynthesis. Also emitted as a by-product of burning fossil fuels.

CARBON SEQUESTRATION

The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one time biomass and continue to store the carbon until burned.

CLEARCUTTING

A method of regenerating an even-aged forest stand by the cutting of essentially all trees, producing a fully exposed microclimate for the development of a new age class.

CLIMATE CHANGE

An alteration in measured quantities (e.g., precipitation, temperature, radiation, wind and cloudiness) within the climate system that departs significantly from previous average conditions and is seen to endure, bringing about corresponding changes in ecosystems and socioeconomic activity.

COMMERCIAL FOREST

Forest land that is able to grow commercial timber within an acceptable time frame and is designated for such a purpose.

CROWN LAND

Public land that is managed by the federal or provincial/territorial government.

DEFORESTATION

Permanent removal of forest cover and withdrawal of land from forest use, whether deliberately or circumstantially.

ECOSYSTEM

A dynamic system of plants, animals and other organisms, together with the nonliving components of the environment, functioning as an interdependent unit.

EMISSIONS

Waste substances released into the air or water.

FOREST MANAGEMENT

That branch of forestry concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation.

FRAGMENTATION

The splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat. Habitat can be fragmented naturally or from forest management activities, such as clearcut logging.

GREENHOUSE EFFECT

The warming of the Earth's atmosphere caused by increasing levels of carbon dioxide and other gases in the air, which trap the sun's heat within the atmosphere.

GREENHOUSE GASES

Those gases, such as water vapour, carbon dioxide, tropospheric ozone, nitrous oxide, and methane, that are transparent to solar radiation but opaque to longwave radiation. Their action is similar to that of glass in a greenhouse.

GREENHOUSE GAS SINKS

Any process, activity or mechanism that removes greenhouse gases or their precursors from the atmosphere. The principal natural mechanism is photosynthesis.

GREENHOUSE GAS SOURCE

Any process or activity (e.g., forest fires or conversion of forest land to agricultural or urban uses) that releases greenhouse gases or precursors of those gases into the atmosphere. As trees and forest products decompose or burn, they release carbon in the form of carbon dioxide.

HARDWOOD(S)

Broad-leaved trees; also refers to the wood produced by these trees. Hardwoods belong to the botanical group angiospermae and are the dominant type of tree in the deciduous forest.

MEGATONNE (MT)

One million tonnes. Greenhouse gas emissions are often measured in megatonnes.

NON-TIMBER FOREST PRODUCTS

Any commodity obtained from the forest that does not necessitate harvesting trees. Includes game animals, fur-bearers, nuts and seeds, berries, mushrooms, oils, foliage, medicinal plants, peat and fuelwood, forage, etc.

NON-TIMBER RESOURCE VALUES

Values within the forest other than timber that include, but are not limited to, biological diversity, fisheries, wildlife, minerals, water quality and quantity, recreation and tourism, cultural and heritage values, and wilderness and aesthetic values.

PLANTATION FOREST

Forest stands established by planting and/or seeding in the process of afforestation or reforestation which are either of introduced species (all planted stands) or intensively managed stands of indigenous species, which meet the following criteria: one or two species at plantation, even age class, regular spacing.

PROTECTED AREA

A geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.

REFORESTATION

The reestablishment of trees on denuded forest land by natural or artificial means, such as planting and seeding.

RESEARCH AND DEVELOPMENT (R&D)

Set of activities directed toward improving and innovating products and processes from a technological point of view and not from a commercial point of view. Encompasses basic research, applied research and development.

SCIENCE AND TECHNOLOGY/S&T

Systematic activities that are closely concerned with the generation, advancement, dissemination and application of scientific and technical knowledge in all fields of science and technology, including such activities as research and development (R&D), scientific and technical education and training, and scientific and technological services.

SILVICULTURE

The art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

SOFTWOOD(S)

Cone-bearing trees with needles or scale-like leaves; also refers to the wood produced by these trees. Softwoods belong to the botanical group gymnospermae and are the predominant tree type in coniferous forests.

STAND

A continuous group of trees sufficiently uniform in age-class distribution, composition and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit.

STEWARDSHIP

The science, art and skill of responsible and accountable management of resources.

STUMPAGE FEE

The fee paid by an individual or company for the timber they harvest from public forests or privately owned forest land.

SUSTAINABLE FOREST MANAGEMENT

Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social and cultural opportunities for present and future generations.

TEMPERATE FOREST

One of three main forest zones in the world (see also boreal forest, tropical forest). The woodland of rather mild climatic areas; composed mainly of deciduous trees.

TROPICAL FOREST

One of three main forest zones in the world (see also boreal forest, temperate forest). A tropical woodland with an annual rainfall of at least 250 cm; marked by broad-leaved evergreen trees forming a continuous canopy.

VALUE-ADDED PRODUCT

Adding value to a product by further processing it. Examples of value-added wood products include joinery stock, windows, doors, kitchen cabinets, flooring and mouldings. Value-added pulp and paper products include such items as packaging, diapers, coated papers, tissue, business papers and stationery, and other consumer paper products.

CONTACTS

The following is a list of organizations that can provide you with additional information about Canada's forests and the forest sector.

British Columbia Market Outreach Network
1200-1130 Pender Street West
Vancouver BC V6E 4A4
Phone: (604) 685-7507
Fax: (604) 685-5373
E-mail: info@bcmon.ca
Internet site: www.bcforestinformation.com

Canadian Federation of Woodlot Owners
180 St. John Street
Fredericton NB E3B 4A9
Phone: (506) 459-2990
Fax: (506) 459-3515
E-mail: nbfwo@nbnet.nb.ca

Canadian Forestry Association
203-185 Somerset Street West
Ottawa ON K2P 0J2
Phone: (613) 232-1815
Fax: (613) 232-4210
E-mail: cfa@canadianforestry.com
Internet site: www.canadianforestry.com

Canadian Institute of Forestry
606-151 Slater Street
Ottawa ON K1P 5H3
Phone: (613) 234-2242
Fax: (613) 234-6181
E-mail: cif@cif-ifc.org
Internet site: www.cif-ifc.org

Canadian Model Forest Network
Secretariat
150-615 Booth Street
Ottawa ON K1A 0E9
Phone: (613) 992-5874
Fax: (613) 992-5390
E-mail: jpugin@nrcan.gc.ca
Internet site: www.modelforest.net

Canadian Wildlife Federation
350 Michael Cowpland Drive
Kanata ON K2M 2W1
Phone: (613) 599-9594/1-800-563-WILD
Fax: (613) 599-4428
E-mail: info@cwf-fcf.org
Internet site: www.cwf-fcf.org

Council of Forest Industries
1200-Two Bentall Centre
555 Burrard Street
PO Box 276
Vancouver BC V7X 1S7
Phone: (604) 684-0211
Fax: (604) 687-4930
E-mail: info@cofi.org
Internet site: www.cofi.org

Ducks Unlimited Canada
1030 Winnipeg Street
PO Box 4465
Regina SK S4P 3W7
Phone: (306) 569-0424
Fax: (306) 565-3699
E-mail: du_regina@ducks.ca
Internet site: www.ducks.ca

Forest Engineering Research Institute of Canada *(FERIC)*
580, boulevard St-Jean
Pointe-Claire QC H9R 3J9
Phone: (514) 694-1140
Fax: (514) 694-4351
E-mail: admin@mtl.feric.ca
Internet site: www.feric.ca

Forest Products Association of Canada
410-99 Bank Street
Ottawa ON K1P 6B9
Phone: (613) 563-1441
Fax: (613) 563-4720
E-mail: ottawa@fpac.ca
Internet site: www.fpac.ca

Forintek Canada Corp.
2665 East Mall
Vancouver BC V6T 1W5
Phone: (604) 224-3221
Fax: (604) 222-5690
E-mail: info@van.forintek.ca
Internet site: www.forintek.ca

Gouvernement du Québec
Ministère des Ressources naturelles [Secteur des forêts]
880, chemin Ste-Foy, 10e étage
Québec QC G1S 4X4
Phone: (418) 627-8652
Fax: (418) 646-4335
E-mail: forets@mrn.gouv.qc.ca
Internet site: www.mrn.gouv.qc.ca

Government of Alberta
Ministry of Sustainable Resource Development [Land and Forest Division]
Petroleum Plaza South Tower
9915-108 Street
Edmonton AB T5K 2G8
Phone: (780) 422-9320
Fax: (780) 427-2441
Internet site: www3.gov.ab.ca/srd

Government of British Columbia
Ministry of Forests [Forest Practices Branch]
727 Fisgard Street, 8th floor
PO Box 9513 Stn. Prov. Govt.
Victoria BC V8W 9C2
Phone: (250) 387-1946
Fax: (250) 387-1467
Internet site: www.gov.bc.ca/for

Government of Canada
Natural Resources Canada [Canadian Forest Service]
Sir William Logan Building, 8th floor
580 Booth Street
Ottawa ON K1A 0E4
Phone: (613) 947-7341
Fax: (613) 947-9038
E-mail: cfs-scf@nrcan.gc.ca
Internet site: www.nrcan.gc.ca/cfs-scf

Government of Manitoba
Department of Conservation [Forestry Branch]
200 Saulteaux Crescent
PO Box 70
Winnipeg MB R3J 3W3
Phone: (204) 945-7989
Fax: (204) 948-2671
E-mail: forestinfo@gov.mb.ca
Internet site:
www.gov.mb.ca/conservation/forestry

Government of New Brunswick
Department of Natural Resources [Forest Management Branch]
Hugh John Flemming Forestry Complex
1350 Regent Street
PO Box 6000
Fredericton NB E3B 5H1
Phone: (506) 453-2516
Fax: (506) 453-6689
Internet site: www.gnb.ca

Government of Newfoundland and Labrador
Department of Forest Resources and Agrifoods [Forest Resources Branch]
Natural Resources Building, 5th floor
50 Elizabeth Avenue
PO Box 8700
St. John's NL A1B 4J6
Phone: (709) 729-2704
Fax: (709) 729-3374
Internet site: www.gov.nf.ca/forestry

Government of Nova Scotia
Department of Natural Resources [Forestry Division]
Arlington Place
664 Prince Street
PO Box 68
Truro NS B2N 5B8
Phone: (902) 893-5671
Fax: (902) 893-6102
E-mail: forestry@gov.ns.ca
Internet site: www.gov.ns.ca/natr/forestry

Government of Nunavut
Department of Sustainable Development
PO Box 1000, Stn. 110
Iqaluit NU X0A 0H0
Phone: (867) 975-5925
Fax: (867) 975-5980
Internet site: www.gov.nu.ca/sd.htm

Government of Ontario
Ministry of Natural Resources [Forests Division]
Roberta Bondar Place
400-70 Foster Drive
Sault Ste Marie ON P6A 6V5
Phone: (705) 945-6746
Fax: (705) 945-5977
Internet site: www.mnr.gov.on.ca

Government of Prince Edward Island
Department of Agriculture and Forestry [Forestry and Land Resource Modeling]
Jones Building
11 Kent Street
PO Box 2000
Charlottetown PE C1A 7N8
Phone: (902) 368-4880
Fax: (902) 368-4857
Internet site: www.gov.pe.ca/af

Government of Saskatchewan
Department of Environment
3211 Albert Street
Regina SK S4S 5W6
Phone: (306) 787-2700
Fax: (306) 787-2947
Internet site: www.se.gov.sk.ca

Government of the Northwest Territories
Department of Resources, Wildlife and Economic Development [Forest Management Division]
149 McDougal Road, 2nd floor
PO Box 7
Fort Smith NT X0E 0P0
Phone: (867) 872-7700
Fax: (867) 872-2077
Internet site: www.rwed.gov.nt.ca

Government of Yukon
Department of Energy, Mines and Resources [Forest Managementt Branch]
Mile 918 Alaska Highway
PO Box 2703
Whitehorse YT Y1A 2C6
Phone: (867) 667-5466
Fax: (867) 667-8601
E-mail: emr@gov.yk.ca
Internet site: www.emr.gov.yk.ca/forestry

International Model Forest Network
Secretariat
250 Albert Street, 13th floor
PO Box 8500
Ottawa ON K1G 3H9
Phone: (613) 236-6163 ext. 2521
Fax: (613) 234-7457
E-mail: imfns@idrc.ca
Internet site: www.idrc.ca/imfn

Maritime Lumber Bureau
PO Box 459
Amherst NS B4H 4A1
Phone: (902) 667-3889
Fax: (902) 667-0401
E-mail: mlb@ns.sympatico.ca
Internet site: www.mlb.ca

National Aboriginal Forestry Association
875 Bank Street
Ottawa ON K1S 3W4
Phone: (613) 233-5563
Fax: (613) 233-4329
E-mail: nafa@web.ca
Internet site: www.nafaforestry.org

National Forest Strategy Coalition
Secretariat
Sir William Logan Building, 8th floor
580 Booth Street
Ottawa ON K1A 0E4
Phone: (613) 947-9087
Fax: (613) 947-9038
E-mail: nfsc@forest.ca
Internet site: nfsc.forest.ca

National Round Table on the Environment and the Economy
200-344 Slater Street
Ottawa ON K1R 7Y3
Phone: (613) 992-7189
Fax: (613) 992-7385
E-mail: admin@nrtee-trnee.ca
Internet site: www.nrtee-trnee.ca

Pulp and Paper Research Institute of Canada *(Paprican)*
570, boulevard St-Jean
Pointe-Claire QC H9R 3J9
Phone: (514) 630-4100
Fax: (514) 630-4134
E-mail: info@paprican.ca
Internet site: www.paprican.ca

Quebec Forest Industry Council
1175, avenue Lavigerie, bureau 200
Sainte-Foy QC G1V 4P1
Phone: (418) 657-7916
Fax: (418) 657-7971
E-mail: info@cifq.qc.ca
Internet site: www.cifq.qc.ca

Sustainable Forest Management Network
G208 Biological Sciences Building
University of Alberta
Edmonton AB T6G 2E9
Phone: (780) 492-6659
Fax: (780) 492-8160
E-mail: sfmnweb@ualberta.ca
Internet site: sfm-1.biology.ualberta.ca

Tree Canada Foundation
1550-220 Laurier Avenue West
Ottawa ON K1P 5Z9
Phone: (613) 567-5545
Fax: (613) 567-5270
E-mail: tcf@treecanada.ca
Internet site: www.treecanada.ca

Wildlife Habitat Canada
310-1750 Courtwood Crescent
Ottawa ON K2C 2B5
Phone: (613) 722-2090
Fax: (613) 722-3318
E-mail: reception@whc.org
Internet site: www.whc.org